DOCUMENT RESUME

ED 330 777 CE 052 107

TITLE Technology Education Advancement for Maine and Scarborough (TEAMS). Final Report.
INSTITUTION Scarborough School District, ME.
SPONS AGENCY Maine State Dept. of Educational and Cultural Services, Augusta.
PUB DATE Mar 88
NOTE 270p.; Technology Curriculum Development Project.
PUB TYPE Reports - Descriptive (141) -- Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC11 Plus Postage.
DESCRIPTORS Communications; Course Content; Course Descriptions; *Curriculum Development; Electronics; Energy; *Industrial Arts; *Integrated Curriculum; Middle Schools; Photography; Secondary Education; *Technology

ABSTRACT

The goal of this project was to develop, implement, and distribute a grade 6-12 technology curriculum that was integrated with science, mathematics, computer programming, English, social studies, and the arts. The development of course outlines and new course lesson plans and materials was the major component of the project. Following the project report proper are extensive appendixes that begin with technology education course listings for the 1985-86 and 1988-89 school years. Appendixes C and D are curriculum outlines for middle school technology education and for the course called Science and Technology. Materials and information in these outlines include purpose, structure, course content, and evaluation. Appendixes E and F contain materials for courses in publications writing, basic electronics, and basic digital electronics. Course summaries, course outlines, and sample course materials are provided. Appendix G is an outline for the photography unit of a course entitled Art Criticism/Photography. Appendixes H-L are outlines for courses in surveying, communications technology, exploring technology, applied technology, and modified wood technology. In Appendix M are an outline for an energy-efficient residential design course and materials for a unit on "hot can" energy. Appendix N contains completed evaluation forms for units of the Principles of Technology program. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED330222

TECHNOLOGY EDUCATION ADVANCEMENT FOR MAINE AND SCARBOROUGH

***** TEAMS *****

VOCATIONAL CURRICULUM
RESOURCE CENTER OF MAINE
KVVTI, P.O. Box 29
Fairfield, Me. 04937

FINAL REPORT - MARCH, 1988

TECHNOLOGY CURRICULUM DEVELOPMENT PROJECT

Prepared by the Scarborough School System
Technology Education Department
Scarborough, Maine 04074

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

with funds provided by the

MAINE DEPARTMENT OF EDUCATIONAL AND CULTURAL SERVICES

under the Carl Perkins Vocational Education Act
P.L. 98-524

Project Coordinators:

Daniel Abbott and Stephen Tewhey

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

CE052107

Technology Education Advancement for Maine and Scarborough

TEAMS

FINAL REPORT

This report includes a number of individual documents that have been prepared over the course of the project year. In many cases these documents have their own page headers and page numbers which appear at the top of the page. The page numbers of this entire report appear at the bottom of each page. The Table of Contents refers to bottom page numbers throughout.

TABLE OF CONTENTS

Section	Page
Project Participants	iv
Curriculum Development Cycle	v
Strategies for Implementing a Technology Curriculum	vi
I. INTRODUCTION	1
A. Summary of original proposal	1
B. Project goal	1
C. First-year report	1
D. Work plan for TEAMS curriculum-development project	2
E. Structure of this report	2
II. MAPPING EXISTING CURRICULUM	3
A. Technology curriculum prior to project	3
B. Faculty	4
C. Facilities	4
D. Organization of facility	5
E. Inventory of all equipment	6

III. NEEDS ASSESSMENT AND PHILOSOPHY.....6

IV. CURRICULUM DEVELOPMENT USING EXISTING RESOURCES.....10

A. Industry and Technology Education Project Curriculum-Planning Guide.....10

B. "Principles of Technology".....14

V. ORGANIZATION OF AN INTEGRATED SEQUENCE OF COURSES.....15

A. Cross-over credit.....15

B. Coordinated program with middle school.....16

VI. DEVELOPMENT OF COURSE OUTLINES AND MATERIALS.....18

VII. DEVELOPMENT OF TWO COMPUTER LABS.....20

VIII. EVALUATION.....21

A. Technology department curriculum review scheduled for five years.....21

B. Review of current new courses.....21

IX. APPENDICES

Appendix A: 1985-86 Scarborough High School Technology Education Course Offerings.....22

Appendix B: 1988-89 Scarborough High School Technology Education Course Offerings.....25

Appendix C: Scarborough Middle School Technology Education Curriculum Outlines.....34

Appendix D: "Science and Technology" Course Curriculum Outline.....52

Appendix E: "Publications Writing" Course Summary, Curriculum Outline, Sample Course Materials.....85

Appendix F: "Basic Electronics" and "Basic Digital Electronics" Course Summaries, Course Outlines, and Sample Course Materials.....139

Appendix G: Photography Unit in "Art Criticism/Photography" Unit Outline.....174

Appendix H: Proposed Surveying Course Outline.....183

Appendix I: "Communications Technology" Course Outline.....187

Appendix J: "Exploring Technology" Course Outline.....190

Appendix K: "Applied Technology" Course Outline.....193

Appendix L: Modified "Wood Technology" Course Outline.....196

Appendix M: "Energy-Efficient Residential Design" Course Outline and "Hot Can" Energy-Unit Materials.....198

Appendix N: "Principles of Technology" Reviews.....206

TECHNOLOGY EDUCATION ADVANCEMENT
FOR MAINE AND SCARBOROUGH

***** TEAMS *****

This project involved a number of people within the Scarborough school system as advisory committee members, curriculum reviewers, curriculum developers, course instructors and administrators. A number of people on the advisory committee served in several capacities.

ADVISORY COMMITTEE

Daniel Abbott (co-chair)	High School Technology Teacher
Beth Bellemere	Curriculum Director
Eugene Chaplin	Middle School Technology Teacher
Sylvia Fengler	Social Studies Lead Teacher
Jan Grant	Reading Specialist
Gerry Hebert	English Lead Teacher
Alan Morse	High School Science Teacher
Hana Strnad	Math Lead Teacher
Steve Tewhey (co-chair)	Computer Specialist
Steve Wilder	Student Teacher - Technology
John Wise	Middle School Art Teacher

CURRICULUM REVIEWERS - PRINCIPLES OF TECHNOLOGY

James Beam	High School Science Teacher
Kathleen Brown	High School Science Teacher
Gene Chaplin	Middle School Technology Teacher
Catherine Docktor	High School Science Teacher
Alan Morse	High School Science Teacher
Stephen Tewhey	Computer Specialist

COURSE DEVELOPMENT AND INSTRUCTION

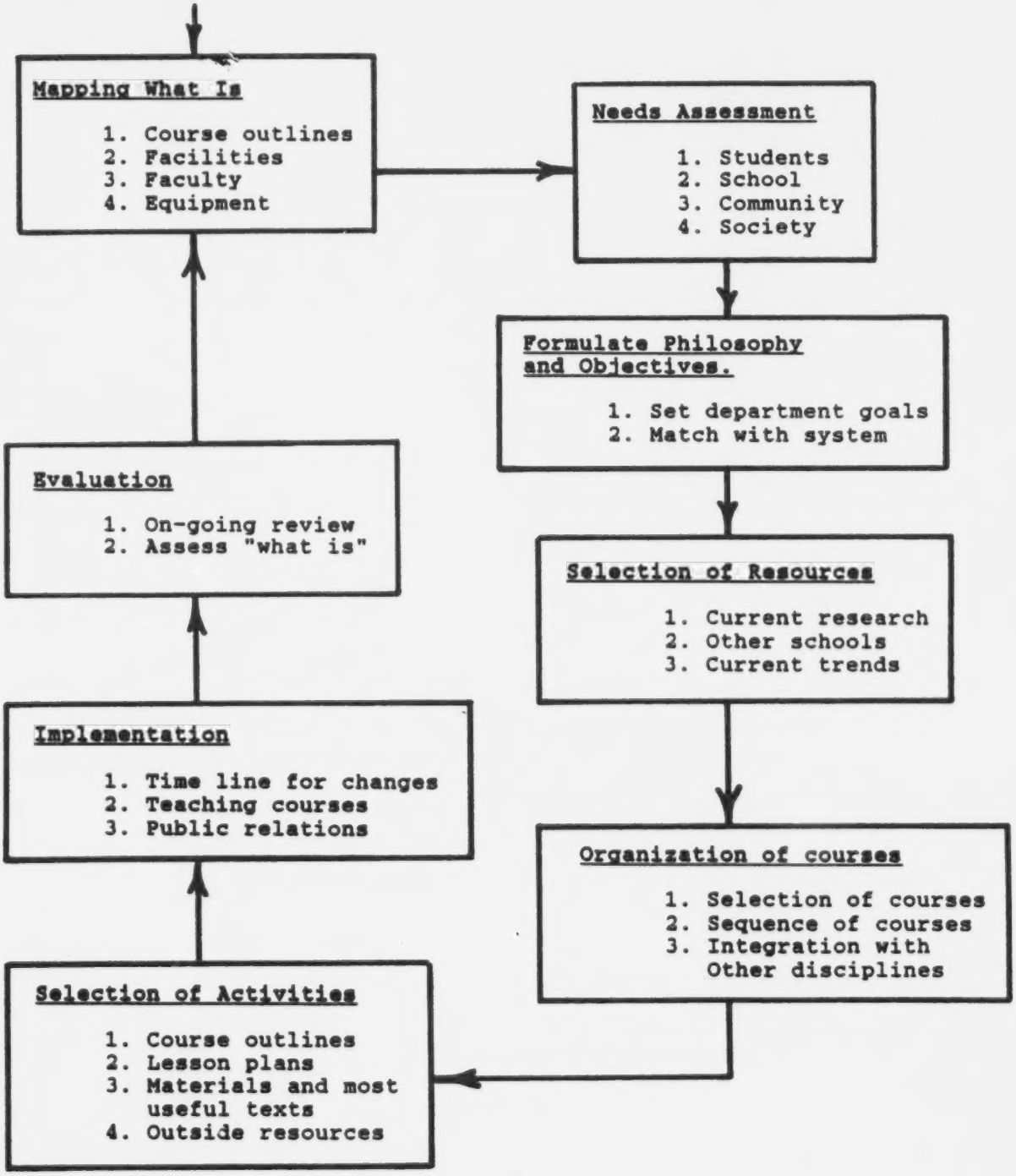
Daniel Abbott	High School Technology Teacher
Alden Hudsen	High School Math Teacher
Pennie Kinney	High School English Teacher
Bruce Munger	High School Technology Teacher
Dean Zaharis	High School Science/Computer

ADMINISTRATIVE SUPPORT

Beth Bellemere	Curriculum Director
Tom Birmingham	State Industrial Arts/Technology Education Consultant
Fred Cole	Business Manager
Shirley Grover	Superintendent of Schools
Paul Malinski	High School Principal

THE CURRICULUM DEVELOPMENT CYCLE

The following cycle was developed by Steve Tewhey in October, 1986 for a presentation at the University of Southern Maine. It has been used to organize the work of this project. We recommend that anybody doing curriculum development use a similar approach to organizing the process.



TECHNOLOGY EDUCATION ADVANCEMENT
FOR MAINE AND SCARBOROUGH

STRATEGIES FOR IMPLEMENTING A TECHNOLOGY CURRICULUM

This document was developed by Dan Abbott in October, 1986 for a presentation at the University of Southern Maine. It was used as a starting point for this project.

A. INTRODUCTION.

This handout contains suggestions for using two strategies for expanding an industrial arts curriculum into a technology curriculum in high schools. The first section addresses recently developed State of Maine graduation requirements. The second suggests cooperative programs with other departments that could lead to an expanded role for technology throughout the school.

B. TECHNOLOGY COURSES AND GRADUATION REQUIREMENTS.

Many school systems, and the State of Maine, have mandated higher graduation requirements which do not specifically include technology courses. If the curriculum is properly designed, some technology courses may satisfy these requirements. Be prepared to prove that your students learn the principles of science, math, design or social studies that you claim to teach. This can be done by pre-testing and post-testing to evaluate the courses.

1. State requirements.

Chapter 127, "Instructional Requirements and Graduation Standards" mandates minimum requirements for all Maine schools. It contains the following section (127.13 F. Vocational Education):

> "Vocational students may, with the approval of the Commissioner, satisfy the second-year mathematics, science, and social studies requirements through separate or integrated study offered as part of the vocational curriculum."

The logic of allowing vocational courses to meet one year of these requirements should also apply to technology courses, particularly if they are designed to teach principles of science, math, and social studies.

2. Science requirements. (127.12 A. "Two credits in science instruction shall be required, including one credit of laboratory study.")

Technology is applied science. By adding or enhancing the teaching of science principles, technology courses may be able to meet a state or local requirement in the following areas:

Technology area	Science principles
a. Construction.	Thermodynamics, levers, vector analysis, characteristics of wood, energy use, stress.
b. Power.	Simple machines, power formulas, mechanical advantage, fossil fuels, energy, combustion, pressure, force, acceleration, internal combustion engine theory.
c. Electricity/ Electronics	Electron theory, means of generating electricity, ohm's law, power formula, parallel/series circuits, polarity, magnetism, force vectors, solid state devices, vacuum tubes, etc.
d. Communications.	Light, electromagnetic spectrum, color principles, photography principles, chemical processes of development, optics, sound, digital communications, basic electronics.
f. Materials processing. metals woods plastics ceramics	Periodic table of elements, atomic structure, compounds, metallurgy, temperature, inert gases (MIG), melting points, cellular structure of wood, tree biology, molecular structure of polymers, adhesion/cohesion, actions of solvents.

2. Fine arts requirements. A year of fine arts is now required of all students. Many technology or I.A. courses contain extensive design elements, or could have such elements included. Courses such as the following might meet this requirement.

a. Graphic arts.

b. Architectural design.

c. Cabinetmaking, woodworking or crafts classes.

4. Math requirements. (127.12 "Two credits in mathematics shall be required.")

Most IA courses have traditionally included a substantial amount of math, covering the same concepts as some basic math courses. It may be possible to demonstrate that students learn enough math to warrant having the course count toward meeting a local or state math requirement.

Technology area	Math principles
a. Drafting	Measurement, scale, metric system, geometric construction, planes of projection, decimals, conversion tables, graphs, basic trigonometry, circles, angles, of protractors.
b. Machine tool.	Precision measurements, formulas for cutting speeds/feeds,decimal measurement, conversion tables, trig functions, drill sizes, taper calculations, thread geometry, cutting tool angles, protractor head use.

C. CONNECTING TECHNOLOGY EDUCATION WITH OTHER DISCIPLINES.

Technology education can improve the schools by providing many opportunities for students to apply theory to real life situations. For many students this is the only way they will learn. The more technology education is a part of the entire curriculum, the more obvious it will be that a technology program is a necessity.

Department	Possible joint courses.
1. Science	Technology is science getting down to business. IA activities can be used to help any student understand science principles in a concrete way. Consider the following efforts: a. An interdepartmental freshman course which explores science and technology. b. A pre-engineering course in material processing and design. c. A joint technical physics course. d. A special course in invention.

2. Fine arts. Consider a joint effort with the art department in design, graphics arts, wood sculpture, metal sculpture, casting, plastics, prints, photography, computer-aided design.

3. English. There are many possibilities for integration in the English department.

a. A journalism class which writes and publishes a school paper.

b. A literary journal as an extra-curricular activity.

c. A class in writing which uses both word-processing and data-base software to organize and produce student work.

4. Performing Arts. A stagecraft course in set design and construction.

A communications course using video technologies and local cable programing.

5. Math. A lab-based applied math class that uses real hands-on activities to teach concepts.

A surveying course.

A technical or applied geometry course.

6. Social Studies. A joint course in the history of technology.

7. Business. A course like Junior Achievement, a company, a product, production, marketing, etc.

8. Home Economics. A course in home design, repair and maintenance.

9. Special Services. Use the IA model to develop a course for special-needs students.

Use the IA model to develop an alternative education course for a non-traditional population.

Technology Education Advancement for Maine and Scarborough

TEAMS

This is a report of the results of a project funded by the Maine Department of Educational and Cultural Services under the Carl D. Perkins Vocational Education Act (P.L. 98-524). The work under this grant was performed by staff members of the Scarborough, Maine school system during the project period from February, 1987 to February, 1988.

I. INTRODUCTION.

The proposal for this project was submitted by the Scarborough school system on July 3, 1986. Funds were received under this grant in January, 1987, allowing a starting date of February 1, 1987. This report represents 13 months of work under the grant from February 1, 1987 - February 29, 1988.

A. Summary of Original Proposal.

The following summary appeared in the original grant proposal submitted on July 3, 1986:

> "The changing school structure and level of student academic failure in Scarborough, as well as the need to update Scarborough's Industrial Arts program, has resulted in the proposal to develop an interdisciplinary, future-oriented, sequential technology curriculum."

B. Project Goal.

The goal of this project was stated as follows:

> "To develop, implement and distribute a 6-12 technology curriculum that is integrated with science, math, computer programming, English, social studies and the arts."

C. First-Year Report.

The first grant year of this proposal ended June 30, 1987. A first year-end report was submitted on June 23, 1987 to the State. That report included a request for project continuation through February, 1988 to allow the process to be completed. The report also included several reviews of the Principles of Technology series, four unit outlines for future courses, minutes of advisory committee meetings, a statement of student needs and a then-current description of course offerings.

D. Work Plan for TEAMS Curriculum Development Project.

The first step taken during the first year of the project was the development of an overall plan for the curriculum work to be done. We decided that curriculum development must be seen as a continuing cycle, rather than a one-time project. A cycle was developed by the project coordinators that included the following sequential steps:

1. Map existing curriculum and resources.
2. Assess the needs of students and the school.
3. Develop a philosophy statement that is consistent with that of the school system.
4. Select existing resources for assistance.
5. Organize an integrated sequence of courses.
6. Develop course outlines, lesson plans, and course materials for each course.
7. Implement the new courses or the changes in existing courses.
8. Evaluate the results.
9. Begin the process again.

During the first grant period, an advisory committee was convened to complete the first five steps of this sequence. The second grant period was needed to allow the faculty in the technology department and other departments to complete steps 6 and 7.

The advisory committee did not meet during the second phase. Individual teachers worked together to develop activities and implement courses. This report contains the results of the curriculum work done during the entire grant period.

E. Structure of This Report.

This report is structured in the same sequence as the Curriculum Development Cycle used to complete the work. The steps listed above are used as outline headings throughout the remaining report. The section that corresponds to step 6, Develop Course Outlines, treats each of the changes that were made in our curriculum as a part of this project.

II. MAPPING EXISTING CURRICULUM.

The first step in this process was to determine what we had to work with in terms of curriculum, faculty, facilities, and equipment.

A. Technology Curriculum Prior to Project.

When this project was conceived in 1985, the high school curriculum in industrial arts education had already gone through several changes aimed at developing a technology education curriculum. These changes resulted in the development of two overview course, one for freshmen and one for sophomores, and the development of a course in energy-efficient construction. Some other modifications had been made to individual courses as well, but the overall course offerings at both the high school and middle school levels comprised a fairly traditional industrial arts curriculum. This included two full-year automotives courses, no communications courses, and no interdisciplinary courses. (See Appendix A for the Scarborough High School 1985-86 course offerings; see Appendix B for 1988 - 1989 course offerings.)

Prior to the submission of this project to the State of Maine for funding, several other changes had been made. The Industrial Arts Department became the Technology Education Department. This has had more significance than might be apparent, because the term industrial arts connotes traditional trades to many people.

The traditional connotation of industrial arts would not include the huge communications industry, the use of computers in all industries, nor the possibilities of joint courses with English, art, social studies or science departments. As a result, many parents would not encourage their children, particularly their daughters, to take industrial arts courses. They might be more receptive to a technology course.

Another benefit of a name change was that it forced us to reconsider our entire 6 - 12 curriculum. We believe that a technology department must develop transferable skills that will serve students in their future jobs, not trade-specific skills that were useful in the past. Calling ourselves a technology program meant we had to determine if our curriculum was designed to do that.

In 1986 we added a Communications Technology course to the high school for the first time. The course was designed to be much broader than a traditional graphic arts course to include video, radio, photography, and computer communications.

B. Faculty.

Our current faculty consists of four teachers certified in industrial arts education, each of whom is strongly committed to the development of a sound, interdisciplinary technology curriculum.

1. Mr. Eugene Chaplin.

Mr. Chaplin teachs technology education courses for 6th, 7th and 8th graders. All 7th and 8th grade students take at least one unit in technology education.

2. Mr. Daniel Abbott.

Mr. Abbott teaches at the high school. He currently teaches a unit in Applied Technology; Electronics; Communications Technology; Drafting and Design; Architectural Design; Publications Writing with Mrs. Pennie Kinney, a member of the English department; and a photography unit with Mrs. Pat Reed, a member of the art department.

3. Mr. Bruce Munger.

Mr. Munger teaches at the high school. He currently teaches Exploring Technology, Science and Technology with Mr. Dean Zaharis, a member of the science department, Wood Technology, and a unit in Applied Technology.

4. Mr. Steven Tewhey.

Mr. Tewhey is the computer specialist for the Scarborough school system. He teaches computer units at both the middle school and the high school and is responsible for overseeing the operation of the computer labs in both schools.

C. Facilities.

1. High School Drafting and Communications Lab.

The drafting and communications lab consists of 21 drafting tables, several drafting machines, a two-year-old Diazit printmaker, an Apple IIe professional computer with a plotter, printer, hard drive and controller for a ROBO CAD system, a Minolta copier, and an AB Dick 320 offset press. It is located in a wing with academic classrooms on the second floor.

2. High School and Middle School Computer Labs.

The computer labs contain 16 Apple IIGS and IIe computers and necessary printers and controllers. Labs are

available to all classes upon scheduling, and to individual students after school. Six additional computers are stored on rolling carts for in-classroom use. The school also has a computer lab for learning programming skills, which uses TRS 80 and Tandy computers. This lab is operated by Mr. Deab Zaharis, a member of the science department.

3. High School Materials-Processing Lab.

The materials-processing lab is located on the lower level below the first floor. It contains an array of both woodworking and metal-working equipment, with appropriate bench space. It also contains a classroom which seats 17. Equipment includes: 3 metal lathes, a metal shaper, oxy-acetylene torches, a vertical milling machine, a surface grinder, pedestal grinders, a MIG/TIG arc welder, a stick arc welder, a horizontal band saw, two drill presses, sheet metal cutting, bending, and forming equipment, an oven, a foundry furnace and self-contained station, a radial arm saw, a circular saw, a jointer, a planer, a band saw, a scroll saw, disc and belt finishing machines and a paint booth.

4. High School Power Lab.

The power lab is adjacent to the materials-processing lab and is set up for automotives work with room for three or four vehicles in one large bay. Equipment includes: a stick arc welder, torches, valve grinding equipment, hydraulic portable lifts, tool cabinets and some of the tools necessary to teach basic automotive diagnosis and repair. The lab and equipment are in very poor condition and need renovation to be effectively used.

5. High School Darkroom.

The darkroom is located in a part of a storage room. It has enough room for 5 students and appropriate equipment to develop black-and-white film and prints. It is located on the first floor in a wing containing math rooms.

6. Middle School Technology Lab.

The facilities at the middle school consist of one general lab with power woodworking equipment, drafting boards, a ventilated paint-spray booth, dust collection, sheet-metal equipment and classroom facilities.

D. <u>Organization of Facility.</u>

The organization of each area varies. The computer lab and materials-processing labs are very well organized for 15 students, excellent flow from one area to the next, and

a clear division of areas. The communications lab lacks a sink and is separated from the darkroom, making it less than ideal for the communications class. It is well organized as a drafting and design classroom with room for both individual tables, a larger work area and a CAD station. The power lab requires repair and reorganization.

E. Inventory of All Equipment.

One key ingredient in developing new approaches to teaching technology is to decide what kind of equipment is necessary for a new approach. This first requires an understanding of what is currently available so that decisions can be made about the feasibility of new purchases. The high school technology department did not have a comprehensive inventory of available resources at the time this project began. This need was overlooked by us initially, but became obvious once course development began. A thorough inventory was done during June, 1988 and entered into a data base for easy updating.

III. NEEDS ASSESSMENT AND PHILOSOPHY.

The TEAMS advisory committee spent a considerable amount of time identifying needs of all students that can be addressed by an interdisciplinary approach to technology education. The following list indicates those needs and discusses what each need implies in designing courses. This needs statement was relied upon heavily in developing the interdisciplinary course in publications writing.

Students entering the 21st century should be engaged in activities that enable them to:

A. Succeed in the social and learning environment of school.

B. Develop self-esteem.

C. Discover and develop their individual talents.

D. Adapt to change.

E. Apply the principles studied throughout the curriculum to a variety of new situations.

F. Learn new skills throughout their lives.

G. Use problem-solving skills effectively.

H. Communicate effectively.

I. Set, meet, and evaluate the outcome of realistic goals.

J. Develop effective work skills and work habits.

K. Make informed career choices.

L. Apply safe work practices and habits in the use of tools, materials, and processes.

M. Work within groups toward a common goal.

N. Understand the impacts of technology on society.

O. Make informed decisions about the ways in which technology is used to meet the needs of society.

The curriculum within a school system should be designed to meet the needs of students. Implications of each of these needs for curriculum development are discussed in the following sections.

A. Succeed in the Social and Learning Environment of School.

Implications for curriculum development:

Students feel a sense of success when they produce a product that is their own. This suggests the value of hands-on, realistic activities within technology education, such as publishing the school paper, designing a house, manufacturing a product, etc.

Instructors should be aware of, encourage participation in, and co-sponsor activities such as science fairs, Olympics of the Mind, student extra-curricular activities, and clubs.

Social success can be encouraged through small-group activities that are carefully structured.

B. Develop Self-Esteem.

Implications for curriculum development:

Self-esteem can be fostered by recognizing that individual learning styles and abilities vary. The technology curriculum itself should be varied enough to provide an opportunity to every student in the school to succeed.

Classrooms and labs should be managed in a manner that minimizes disrespectful treatment of students by other students.

C. Discover and Develop Their Individual Talents.

Implications for curriculum development:

A technology curriculum should be varied enough to provide broad exploratory activities K through 12 in many different areas. Activities within each area should be varied enough to require many different skills.

D. Adapt to Change.

Implications for curriculum development:

Technology education cannot focus on the development of specific vocational skills alone. To adapt to change, students need a grasp of general skills and principles, and they need practice in applying those skills to new areas. A technology curriculum should be broad in focus and include as wide a variety of courses as possible. Each course should build upon similar general skills such as principles of design, layout, math, science, business, project planning, writing, speaking, organization, and others.

E. Apply the Principles Studied Throughout the Curriculum to a Variety of New Situations.

Implications for curriculum development:

This suggests the value of developing a greater number of interdisciplinary courses, and building the application of math, science, social studies, art, and English principles into hands-on technology courses. Those concepts should be studied as a specific aspect of each technology course. It is not enough to assume that students will pick up those principles from the application alone.

Each of the curriculum areas within the school should include hands-on activities that allow application of concepts to real situations.

F. Learn New Skills Throughout Their Lives.

Implications for curriculum development:

Technology courses should be designed to teach students how to seek out, recognize, and use resources. They should not be designed only to teach specific facts.

G. Use Problem-Solving Skills Effectively.

Implications for curriculum development:

Active problem-solving activities should be the core of a technology curriculum.

H. Communicate Effectively.

Implications for curriculum development:

Students in technology courses should be required to write, make presentations, prepare two-dimensional and three-dimensional materials, and explain methods and concepts to other students as a regular part of their course work.

I. Set, Meet, and Evaluate the Outcome of Realistic Goals.

Implications for curriculum development:

Students should be required to develop written plans in any course that requires projects. Students should also be required to evaluate their own work and their courses, prior to an evaluation by the instructor. Student evaluations should be based upon the same criteria used by the instructor. Evaluation criteria must be clearly presented to students at the outset of a course or specific project.

It would be valuable for students to help to design the criteria by which they will be evaluated.

J. Develop Effective Work Skills and Work Habits.

Implications for curriculum development:

Ability to work with others, appropriate behavior in a workplace, willingness to take part in all aspects of a course, arriving on time and prepared for class, and other recognized skills and habits necessary to succeed in the working world should be evaluated as a part of each technology course.

K. Make Informed Career Choices.

Implications for curriculum development:

Career options should be a explored in each technology course in a variety of ways that may include research assignments and reports, field trips, outside speakers, and other methods.

L. Apply Safe Work Practices and Habits in the Use of Tools, Materials, and Processes.

Implications for curriculum development:

The technology curriculum should include a thorough safety program that applies consistently to each course and to all use of lab facilities, including use by non-students.

M. Work Within Groups Toward a Common Goal.

Implications for curriculum development:

Small-group problem solving and project activities should be a formal part of the technology curriculum.

N. Understand the Impacts of Technology on Society.

Implications for curriculum development:

The study of the impacts of technology should be a part of all curriculum areas.

O. Make Informed Decisions About the Ways in Which Technology is Used to Meet the Needs of Society.

Implications for curriculum development:

Students should be required to make decisions, both individually and in groups, about political and social issues involving technology. Energy, environmental issues, bio-technology, communications, weapons systems development, space, conservation, building, waste disposal, water quality, ozone depletion, and other areas should be explored in both technology education and other appropriate courses.

IV. CURRICULUM DEVELOPMENT USING EXISTING RESOURCES.

Although a number of documents have been developed to assist in technology curriculum development, two well-developed and extensive bodies of material were selected for use in this project. One is a curriculum-planning guide, while the other is a specific curriculum designed to teach science skills in a vocational context.

A. Industry and Technology Education Project Curriculum-Planning Guide.

This planning guide was developed by the Technical Foundation of America for the use of industrial arts

professionals. It was made available to all Maine industrial arts teachers through the efforts of the Technology Education Association of Maine and Alden Colby. It contains extensive organizational materials that were used in developing a broad outline for this project.

The following recommendations of the guide are relevant to this project report:

1. Initiating and implementing new and improved programs.

    a. Scope and sequence.

        1. A variety of course offerings should be available in each of the four clusters.
        2. First courses should be broad orientation and exploration of subject matter.
        3. Transition should be made from basic learning to specialized interests in higher-level courses.
        4. All upper-level courses should be available to all students, whether they have taken basic courses or not.

    b. Course clusters.

        1. Communication.
        2. Construction.
        3. Manufacturing.
        4. Transportation.

    c. Course length: recommended one semester.

    d. Facilities: multi-purpose for basic levels, with specialized facilities available for upper-level courses.

2. Adaptation of Scarborough curriculum to this plan.

    For our purposes, the overall organization expressed above has been used as a structure in viewing and modifying the Scarborough curriculum. For a number of reasons, the specifics of the courses recommended have not necessarily been adopted but several changes have been made that are consistent with this plan.

    a. Communications.

        This highly significant area has been expanded at the high school level by the addition of a broad Communications Technology course, the development of screen printing and photography facilities, and

the planning of new photography darkroom facilities when the school undergoes a future expansion. Five high school courses, both basic and advanced, now include specific communications units: Exploring Technology, Science and Technology, Communications Technology, Publications, and Photography/Art Criticism. Two of those courses emphasize computer applications in communications.

In addition to these courses, a Basic Electronics course has been developed and added under this grant, with a second course in electronics - Basic Digital Electronics - to be offered as a second semester course in the Spring of 1989.

b. Construction.

1. Overview. This area is covered in the freshman Exploring Technology course by a very popular unit. An overview of the entire process of wood-frame construction is presented, with coverage of site preparation, alternative construction techniques, energy-efficient basics and basic design elements covered. Each student constructs a structural corner section of a platform-framed house, using dimension lumber the class has manufactured from pine.

2. Advanced courses. Specific upper-level courses involving construction include an energy efficient design course, which includes construction of a full-sized storage building, and architectural design in which students do the planning, design, energy analysis, drawing, and model making for a single-family house.

c. Manufacturing.

1. Overview. An introduction to manufacturing occurs in the middle school programs and in the freshmen Exploring Technology course and the Science and Technology course. As a result of this curriculum project, a new unit in mass production is being developed for implementation during quarter 2 of this course.

This mass-production unit will replace an advanced Metric 500 unit currently in the curriculum. This is being done for two reasons. The excellent Metric 500 unit developed and delivered by Mr. Eugene Chaplin at the middle school level is so thorough that it makes an advanced unit unnecessary. (See Appendix C.) The existing curriculum lacked a complete mass-production unit, which includes managerial processes, research and design,

formation of company, production, distribution and sale of products.

2. Advanced courses. Manufacturing is also covered in specialized advanced courses. Applied Technology involves one semester of the study of materials, primary and secondary processing, design and production of products of metal, plastic or wood, or a combination of each. This course emphasizes precision machining operations, sheet material use, casting, joining, heat treating, forging, and finishing. (See Appendix K.)

Wood Technology presents a one-semester course with an emphasis on aesthetics and design of wood products. Drafting and Design includes a one-quarter unit on product design. (See Appendix L.)

d. Transportation.

1. Overview. This area is covered in the excellent middle school Metric 500 unit, which includes tests of aerodynamic features of design, and basic principles of science involved in vehicle design. The area of transportation is also covered in overview in one semester of the Applied Technology course. Basic principles of transportation are covered through a problem solving unit. Basics of internal-combustion engines are presented through a unit on small engines and automobiles.

2. Advanced courses. There are currently no advanced courses being offered in transportation at Scarborough. At the time this project began, transportation units appeared in four courses. Now they appear in only one.

There are a number of reasons for this reduction in the fourth area of the curriculum. We have a change of faculty in the department, leaving us with less expertise in the most traditional transportation area -- automotives. Student interest in these upper-level courses had declined. The equipment necessary to conduct appropriate labs in transportation is presently unavailable and expensive. The liability insurance required for doing any lab work on vehicles that are to be used is no longer available to the school because of cost. In addition, two excellent automotive programs exist at the two nearby regional vocational schools.

These are the practical reasons for limiting our advanced offerings in the transportation cluster. The most significant reason for this, however, is philosophical. One technology teacher in this system works exclusively as a computer specialist, an extremely important and timely role. Another is responsible for all of the varied offerings at the middle school level. The remaining two instructors must teach the wide variety of courses that make up the bulk of the high school technology curriculum. Although this department sees the transportation cluster as important, we do not believe it is as critical a component of a high school curriculum as the communications, construction, and manufacturing clusters.

B. Principles of Technology.

1. Summary.

These curriculum materials were provided by Tom Birmingham, the Maine state consultant for Industrial Arts/Technology education. They are extensive and detailed lesson plans and other curriculum materials. We had the following units available to use for review: Force, Work, Power, Resistance, Momentum, Waves and Vibrations, Force Transformers, Energy, and Rate.

2. Recommended use.

These units were specifically designed to be offered in sequence as a full two-year program for 11th- and 12th-grade vocational students. Our goal in reviewing these materials was to determine their application to a high school setting. We found that the materials are excellent when used to supplement the broad cluster areas identified above for technology education. However, a faithful adherence to the complete proscribed sequence could not be made within the framework of our technology education curriculum without dramatically changing the focus of our program. Such a change is not seen as desirable by the department.

These materials were reviewed by a wide range of technology and science teachers. Nearly every reviewer responded favorably to demonstrations and experiments contained in the units. Several have already been incorporated into courses from grade 7 to grade 12. As an example, a laboratory from the unit on resistance was used to develop a wind tunnel for testing a variety of shapes for streamlining. The design of a vertical wind tunnel was modified by Mr. Chaplin to form a horizontal wind tunnel to test the relative drag of Metric 500 racers. These wind tunnels are used by students in experiments at the 7th- and 8th-grade level.

A great many more elements from these units will be incorporated into existing courses. This is likely to be done by both our technology and science departments. The technology faculty will continue to encourage use of these materials in our current career-education science courses. Although the use of the full materials as designed was considered, none of the reviewers felt that the materials should be used as planned by the developers as a stand-alone 11 - 12 course.

Those who were paid for these reviews spent from 3 to 5 hours per unit and completed a summary report sheet. The program coordinators did a less extensive review of all of the materials. There was excitement about elements of many of the units. Several science teachers were impressed with the real-world examples used in units like Waves and Vibrations, and technology teachers were pleased with the presentation of science principles that supported activities in their courses. However, there was general agreement that the best use of the Principles of Technology series would be supplemental to the technology and science curriculum.

All report sheets are reproduced in Appendix N.

V. ORGANIZATION OF AN INTEGRATED SEQUENCE OF COURSES.

This project resulted in a number of changes in the technology education program in Scarborough. These changes took several forms, including the development of several new courses, the development of individual units within courses, and changes in the delivery of units in some existing courses. The changes are each presented below.

A. Cross-Over Credit.

One of the most critical goals of this project was to develop strong curricular links with other areas of the school. Recent increases in academic graduation requirements, both at the state and local level, added to the advisability of making these interdisciplinary connections.

Although we are concerned that increased graduation requirements may have an adverse affect on the number of students who are able to take non-required courses within our department, we take this effort to improve education very seriously. We have worked hard to adapt to these requirements where a connection with technology education is feasible. In all cases, we feel that connecting the technology education model of education to other subject areas improves the education received by the students affected.

We have been careful in assessing the possibilities for cross-over credit to meet the intent of the new graduation requirements. We did far more than simply say that our existing courses would now be given other credits. Courses receiving Scarborough science credit do so because of their emphasis on the principles of science which underlie the material covered in the course. The courses receiving fine arts credit provide a background in history and aesthetics as well as design. In several cases, technology education teachers are working directly with teachers in science, art, and English to deliver these courses.

The content of each of the courses in the technology department was carefully reviewed to determine if cross-over credit from another department would be appropriate. On the basis of that review, the following courses carry the cross-over credit noted.

1. Exploring Technology - one Scarborough science credit.

2. Science and Technology (team-taught by a science teacher and a technology teacher) - one Scarborough science credit and one state science credit.

3. Applied Technology - one Scarborough science credit.

4. Communications Technology - one fine arts credit.

5. Wood Technology - one-half fine arts credit (one semester).

6. Architectural Design - one fine arts credit.

7. Electronics - one-half science credit (one semester).

8. Publications writing (team-taught by an English teacher and a technology teacher) - one-half fine arts credit and one-half English credit.

9. Art Criticism/Photography (team-taught by an art teacher and a technology teacher) - one-half fine arts credit (one semester).

B. Coordinated Program With Middle School.

One of the major shortcomings of the Scarborough technology program at the onset of this project was that high school teachers and the middle school teacher worked almost entirely independently. As a result of this project, we have inmproved this situation dramatically. The middle school technology teacher was a member of the advisory board overseeing this project. Several curriculum meetings have been held with him and the high school teachers. There is also far

more frequent contact between individual members of the department to discuss curriculum issues.

Throughout our curriculum we are attempting to respond to the needs of youth which were identified by the advisory committee. A key focus of this curriculum is the appearance of the elements of design and engineering in every course, from grade 6 through grade 12. These are seen as general skills that are necessary for success in any industry or occupation.

A short overview of the revised curriculum for grades 6 - 12 follows:

1. Sixth grade.	A brief overview of manufacturing a product of wood, metal, leather, or plastic assures that students will have a successful introduction to technology education.
2. Seventh grade.	This level provides a unit of the Metric 500 and covers prinicples of safety, design, production, research, testing, sketching and competition. This is an extremely popular and valuable unit.
3. Eighth grade.	This manufacturing unit involves a sole proprietorship of each student to plan, sketch, develop patterns and bill of materials, design and produce one or more useful products.
4. Ninth grade.	Exploring Technology and Science and Technology courses provide an overview of personnel systems, safety, drafting, residential construction, power, electricity and mass production.
5. Tenth grade.	Applied Technology provides an overview of design and precision manufacturing, power, transportation and problem solving.
6. Other H.S. courses	Wood Technology -- design and production of furniture. Basic Drafting and Design. Architectural Design. Students design, analyze the energy needs, produce the drawings and make a model of a single-family house.

Energy-Efficient Design. Students learn and apply the elements of energy-efficient design while constructing a building.

Communications Technology. Video productions, photography, offset printing, screen printing, computer layout and design, and graphics design are covered.

Photography. This is one unit in a fine arts course taught by an art teacher and a technology teacher.

Basic Electronics. A lab-based introduction to electronics.

Basic Digital Logic. A lab-based introduction to the logic systems used in computers.

Publications Writing. A writing and production course taught by an English and a technology teacher to produce the school newspaper.

VI. DEVELOPMENT OF COURSE OUTLINES AND MATERIALS.

The development of course outlines and new-course lesson plans and materials was the major component of this project. The following courses or units have been modified as a result of this project.

A. Middle School curriculum outlines (Appendix C).

B. High School Curriculum Outlines.

1. Science and Technology course (Appendix D).

This is an unusual course that has now been operated for two years. It teams a science teacher and a technology teacher to provide a course for a single group of students. They have two periods available to the class; they may work together with all students for a double period, break the group into smaller groups, or meet with students individually for a single period.

The flexibility of this course was demonstrated during this year. Because of a change in staff and course assignments, neither Dan Abbott or Alan Morse, the teachers who developed the curriculum, were able to teach it this year. The course was

taught instead by Bruce Munger, a technology teacher, and Dean Zaharis, the computer-programing teacher, who is also a physics teacher.

Both of these instructors improved on the delivery of the course, bringing individual interests and knowledge into the existing outline. One of the most significant improvements made by these instructors has been an increase in the amount of actual team-teaching. They choose to spend a considerable amount of time with double class periods and with both instructors attending the entire class session. This clearly strengthened the delivery of the course.

Another key addition to the Science and Technology course was the development by Mr. Zaharis and Mr. Munger of a unit on surveying. The students were responsible for developing contour maps of the area around the school.

Although no major changes were made in curriculum design, it is anticipated that such changes will be considered at the end of the second semester for delivery next year.

2. Publications Writing course curriculum outline and course materials (see Appendix E).

   The materials for the publications course appear in Appendix F. Sections included are as follows:

   a. Summary.

   b. Curriculum outline with daily lesson plans.

   c. Mid-term exam.

   d. Sample student materials.

   e. Copy of the 8th edition of the Redskin Review.

3. Electronics courses curriculum outlines and course materials (see Appendix F).

5. Photography unit in Art Criticism/Photography course (see Appendix G).

6. Proposed surveying unit for Applied Technology and Exploring Technology (see Appendix H).

7. Modified Communications Technology course outline (see Appendix I).

8. Modified Exploring Technology course outline (see Appendix J).

9. Modified Applied Technology course outline (see Appendix K).

10. Modified Wood Technology course outline (see Appendix L).

11. Energy-Efficient Residential Design course outline and Hot Can energy-unit materials (see Appendix M).

VII. DEVELOPMENT OF TWO COMPUTER LABS.

The process of modernizing the technology department has required adapting to the use of computers for a variety of tasks. This adaptation was well underway at Scarborough at the time this project began. The technology department had been using TRS 80 or Apple IIe computers for 4 years for a variety of tasks. Since this project began, however, the technology department has expanded functional computer use dramatically by the integration of computer technology into all subject areas.

Computer technology in Scarborough goes beyond traditional computer-science courses and computer literacy programs which teach programming and basic skills. Our computer technology curriculum includes an additional component known as <u>functional literacy</u> which focuses on making computers an integral part of every student's education across the curriculum. The technology department not only teaches computer technology within the department but integrates that technology throughout all the grade levels and subject areas in the system. Two labs are used for this purpose, one at the middle school and the other at the high school. One technology teacher, Stephen Tewhey, implements this functional use of computers for grades 7 through 12.

Scarborough's philosophy is that students should learn to use the computer as a life-long tool for learning and productivity. The technology department teaches layout and design using computer-aided design (CAD) software, and the architectural classes use HotCan energy analysis software for estimating heat loss on residential buildings. The school newspaper is designed and edited with desktop-publishing software as part of the communications course.

Computers are located in classrooms, libraries, learning centers, and computer labs, and have been integrated into the curriculum in the following ways: drill and practice programs are used at all levels to provide enrichment and remediation; specially-designed keyboards and software allow younger children to interact and become familiar with the computer, while at the same time learning to follow directions and develop sequencing abilities; word-processing programs with graphics capabilities reinforce writing skills and stimulate creative expression in

English classes; specially adapted sensors allow science students to perform experiments and make measurements; and finally, graphing, stories, and spread sheets help teach problem-solving techniques and reasoning skills.

VIII. EVALUATION.

A. Technology Department Curriculum Review.

The staff-development committee of the Scarborough school system has developed a schedule for system-wide curriculum evaluations of each subject area. Each of the areas will be evaluated and revamped during the course of one calender year every five years. This kind of schedule fits the plan developed for this project which calls for repeating the planning cycle on a regular basis. The technology department curriculum developed under this project is scheduled for its next year-long evaluation in five years, 1991 - 1992.

In the meantime we will continue to complete the cycle identified at the beginning of this project period on a continuous basis.

B. Review of current new courses.

Review and evaluations of current courses will be done at the conclusion of the current school year. Evaluations to date of the two new courses developed this year under this project, Publications Writing and Electronics, are included in the descriptions which appear in the Appendices E and F.

IX. APPENDICES

Appendix A

1985-86 Scarborough High School Technology Education Course Offerings

COURSE OFFERINGS 1985 - 1986
INDUSTRIAL ARTS DEPARTMENT

Scarborough High School
Scarborough, Maine

INDUSTRIAL ARTS

The full-year Exploring Technology and Applied technology courses are designed for those students who intend to follow the Industrial Arts Program as their main course of study. In addition, students not taking Industrial Arts as their main course of study may take full-year or semester courses as described below. Exploring Technology must be taken as a full-year course.

Vacancies in any course may be filled with students from any grade level, both boys and girls, provided they meet course prerequisites.

EXPLORING TECHNOLOGY (IA063) — Full year — 1 C-UNIT, 4 G-UNITS

This course is designed for the student who has no previous background in Industrial Arts. The course will include units in:

Communications (12 weeks) This unit in communications will introduce the student to three methods of communicating by technical drawing, graphic arts, and electronic technology. The student will make drawings and plans of products using drafting instruments, produce printed information by screen printing and offset lithography, and study radio electronics by testing and making a two-transistor radio.

Introduction to Construction (12 weeks) The purpose of this unit is to give the student the opportunity to develop understanding of the material and processes of the residential construction industry. The students will construct a model corner section of a house. Career opportunities will also be emphasized.

Today's Power (12 weeks) Two units of study will make up this twelve-week course. The first unit will be entitled Power Production. During this six-week period, students will explore the theory of two- and four-cycle engines, the use of these engines, alternate fuel forms, and the service and reconditioning procedures.

The second unit will involve students in a unit entitled Electrical Technology. This unit covers such items as parallel circuits, voltage, amperage, resistance, and the various forms of electrical power production. Students will involve themselves in wiring various switching loops, duplex receptacles, etc. Another aspect of this unit will explore career possibilities in the field of electrical power.

APPLIED TECHNOLOGY (IA073) — Full year — 1 C-UNIT, 4 G-UNITS

This course is designed for grade 10 students who have satisfactorily completed Exploring Technology or have the instructor's approval based on an alternate background.

PREREQUISITES: Successful completion of one year of high school math.

Metal and Plastic Technology (One Semester) This course will give the student an opportunity to explore all areas of metal and plastic technology The student will design, plan, and manufacture products in major metal and plastic areas. Post secondary and career opportunities will also be emphasized.

Problems in Transportation (One Semester) During the first quarter of this area of study, the students will become directly involved in diagnosis and correction of problems concerning today's modes of transportation. The second quarter of this unit exposes students to the technical aspects of auto body repairs such as psinting, sanding, priming, parts and glass replacement, etc.

INDUSTRIAL ARTS ELECTIVE COURSES

The following Industrial Arts courses are open to all interested students.

Communication

DRAFTING BASICS (IA313) — Full year — 1 C-UNIT, 4 G-UNITS

PREREQUISITES: One year of high school math

This course is designed for students who want to learn the fundamentals of drafting. It will serve as a background for students going into engineering and technical schools as well as those going directly into a trade. The students will make drawings and plans, produce blueprints by diazo and instruction sheets by offset printing methods.

ARCHITECTURAL DRAFTING (IA323) — Semester two — ½ C-UNIT, 2 G-UNITS

PREREQUISITES: Drafting Basics or two years of high school math

This course is designed to provide basic instruction in preparing architectural working drawings and to serve as a reference for design and construction principles and methods. The student will make drawings of floor plans, elevations, sections and pictorial drawings of houses. Solar concepts in design, earth sheltered housing, site selections, insulation and heating systems will also be covered.

COMMUNICATIONS ELECTRONICS (IA513) — Full year — 1 C-UNIT, 4 G-UNITS

PREREQUISITES: Two years of high school math.

Topics to be covered in this course will include transistors, capacitors, inductors, and many other electronic components. The student will be involved with the components mentioned as well as several pieces of test equipment.

There will be at least one major project involving the construction of some form of radio receiver.

Power and Transportation

SERVICE TECHNOLOGY I (IA913) — Semester One — ½ C-UNIT, 2 G-UNITS

PREREQUISITES: One year of high school math

Theory and service will make up a big part of this unit. Students will study the theory of operation of automotive systems such as the cooling system, charging system, lubrication system. etc.

The knowledge of these systems will be further reinforced by learning the proper service techniques involving these systems.

SERVICE TECHNOLOGY II (IA923) — Semester Two — ½ C-UNIT, 2 G-UNITS

PREREQUISITES: One year of high school math or Service Technology I

This unit will cover automotive systems not covered in Service Technology I Suspension systems, tires, brakes, and body designs will be some of the topics covered. Lab work will center around the systems mentioned.

TECHNOLOGY IN TRANSPORTATION I (IA713) — Semester One — ½ C-UNIT, 2 G-UNITS

PREREQUISITES: One year high school math and one year of Industrial Arts

Exploration of the automotive industry from production to service will be the focus of this course. Lab experience will involve service of engines, transmissions, differentials, clutches, etc.

TECHNOLOGY IN TRANSPORTATION II (IA723) — Semester Two — ½ C-UNIT, 2 G-UNITS

PREREQUISITES: One year high school math ane one year of Industrial Arts

Students will focus on various modes of transportation during this eighteen-week period. Some subject matter will be involved with mass transit, electric automobiles, trains, air transit, etc. Lab experiences will involve students in servicing the vehicles of their choice.

Production and Construction

WOOD TECHNOLOGY (IA113) — Semester One — ½ C-UNIT, 2 G-UNITS

PREREQUISITES: Third or fourth year of high school

This course will be offered the first semester. It is designed to advance the student's knowledge in construction of wood products. Wood lathe operation and cabinet making processes will be covered. Students will select products of his or her choice to manufacture.

ENERGY EFFICIENT CONSTRUCTION (IA613) — Semester Two — ½ C-UNIT, 2 G-UNITS

PREREQUISITES: Third or fourth year of high school

This course will be offered during the second semester only. The purpose is to give the student the opportunity to develop problem solving abilities and understandings related to the materials, processes, and products used in energy efficient residential construction. Emphasis is placed on solar concepts in design, earth sheltered housing, site selection, insulation, and heating systems. The students will take part in the actual construction of a structure.

Appendix B

1988-89 Scarborough High School
Technology Education Course Offerings

Technology Department Course Descriptions 1988-1989

The following course descriptions have been revised and rewritten to reflect semester grading policy and updating of course content.

I. EXPLORING TECHNOLOGY TE063 Two Semesters 4 G-units

This course offers an introduction to a variety of areas within technology education. It is a two semester course.

Semester 1. Communication: this unit introduces students to the process of communicating through drafting. Each student will make architectural and automotive drawings using drafting equipment.

Residential Construction: This unit gives students an opportunity to use the materials and processes of the residential construction industry. Students will learn the safe use of tools and machines and will construct a scale-model wood-frame house.

Semester 2. Power and Electricity: This unit explores the theory and applications of power and electricity principles. Activities will include residential wiring and introductory electronics.

Business and manufacturing: This unit explores the processes used in setting up a business, researching, designing, mass producing, and selling a product.

Course prerequisites: Open to all students but generally taken in 9th grade.

Cross-over credit: meet one year of Scarborough High School science requirements.

II. SCIENCE AND TECHNOLOGY (SC637) 2 period 2 semesters 8 G-units

Taught by one science and one technology instructor, this course combines the study of science theory and applications.

Semester 1. The student learns techniques of drafting, design and graphic arts while studying the basic supporting science principles. The student draws and constructs a model corner-section of a wood-frame house while investigating the form, function, and physical qualities of its components.

Semester 2. The student views the heating and wiring of the single-family home along with the principles of heat transfer and electricity. A unit on musical instruments stresses the physics of sound while another on basic electronics prompts a study of atomic structure, forces, magnetism, motion, and power. A final project will involve exploring the processes used in setting up a business, researching, designing, mass producing, and selling a product.

Throughout the course, 40% of the time and grade is project based, 20% based on tests and quizzes, and 40% divided between homework, notebooks, and classroom performance.

COURSE PREREQUISITES: Open to all students, but intended for 9th graders. May not be taken with Exploring Technology.

Credits: Meet one year of Scarborough and State of Maine science requirements, and one year of cross-over science credits for a total of 2 years science credit.

III. APPLIED TECHNOLOGY (TE073) Two semesters; 4 G-units

This course covers the theory and applications of the manufacturing and transportation industries. It is a two-semester course.

Semester 1. Materials of Manufacturing: This unit involves the theory and application of a variety of manufacturing processes. Each student will design, plan, and manufacture products of metal and plastic by machining, welding, forming, casting, heat treating, and other assembly processes. The science principles underlying these processes will be studied.

Semester 2. Gasoline-Engine Repair: This unit covers basic diagnosis and service of 2- and 4-cycle engines, including the electrical, fuel, alignment, air conditioning, and cooling systems of an automobile. Activitites will include performing various operations on small engines and automobiles.

Sheet-Metal Design and Repair.: Students will study the theory and processes required to design, fabricate, and repair sheet-metal products. Activities will include design and manufacture of one product, and auto-body repair using brazing welding and filler material.

COURSE PREREQUISITE: Exploring Technology or one year of high school math.

Cross-over credit: meet one year of Scarborough science requirements.

IV. WOOD TECHNOLOGY (TE113) One Semester; 2 G-units

This course covers characteristics of wood and the safe use of production tools to design and manufacture a product of wood. Each student will complete two assigned projects and one designed project of wood.

COURSE PREREQUISITE: Completion of one year of high school.

Cross-over credit: meet one semester of fine arts requirements.

V. TRANSPORTATION TECHNOLOGY eliminate.

VI. SERVICE TECHNOLOGY eliminate.

VII. BASIC DRAFTING AND DESIGN (TE323) 2 semesters; 4 G-units

This course provides a basis in drafting and design fundamentals. It provides a background for students going into engineering and vocational schools or the trades.

Semester 1. Basic Skills: This unit covers the basic language of drafting, including line conventions, lettering, use of equipment, and orthographic projection and Computer-Aided Design (CAD).

Semester 2. Engineering Design: This unit provides students with an opportunity to apply the basic skills of semester 1 to the design of specific products or buildings. Students will design and execute working drawings of products. Semester 1 is a prerequisite for semester 2.

COURSE PREREQUISITE: Exploring Technology or one year of high school math. Semester 2 cannot be taken without semester 1.

VIII. ARCHITECTURAL DESIGN (TE323) Two semesters; 4 G-units

This is a design course. Students will apply a knowledge of architecture and standard drafting skills to designing and executing drawings for a single-family home.

Semester 1. This unit will cover architectural history and design, housing design, building codes, zoning, priniples of construction, and energy efficiency principles. Each student will complete a preliminary design for a single family-home, and complete an acurate plot plan.

Semester 2. This unit will cover foundation, flooring, wall and roof construction techniques. Students will complete foundation, floor, elevation plans, and a model of the house they have designed. An energy analysis will also be completed.

COURSE PREREQUISITES: Basic Drafting and Design or two years of high school math. Semester 1 is a prerequisite for the semester 2 unit.

Cross-over credit: meet one year fine arts requirement of State of Maine and Scarborough.

XII. COMMUNICATIONS TECHNOLOGY (TE303) 2 semesters; 4 G-units

This course provides a broad overview of the communications industry. It emphasizes design principles, the history of communications technologies, the application of science principles to the communications areas, and the production of typical products within the industry.

Semester 1. This unit will cover the history of language and printing, the development of photography and video communications, basic communications, electronics, and computer-based communications systems. Activities will include shooting, developing, and enlarging photographs, making a video-taped presentation, production of individual video tapes, writing and completing a video-taped production.

Semester 2. This unit will cover the various printing process available, advertising design and marketing, copy design and layout, graphics art, bookbinding, and product design and manufacture. Each student will design and produce products using offset-lithographic printing, photographic screen printing and hand-cut screen printing.

COURSE PREREQUISITES: Completion of 10th grade or permission of instructor.

Cross-over credits: One year fine arts requirement. This course emphasizes design, science principles, and production of products.

XIII. PUBLICATIONS WRITING - Newspaper production - 2 Semesters; 2 G-units English, 2 G-units fine arts

This course will provide a series of practical experiences in the creative and technical aspects of publishing. The class will be responsible for producing the school newspaper on a regular basis.

STUDENTS NOT ENROLLED IN THIS COURSE MAY STILL PARTICIPATE IN NEWSPAPER.

Course content - all students will be required to complete activities designed to develop skills in research, journalism, writing for publication, editing, proofreading, interviewing, typesetting, lay out, advertisement development, graphic design, printing processes, offset-press operation, color registration, photographic journalism, and business management.

IX. BASIC ELECTRONICS (TE513) one semester; 2 G-units

This course provides an introduction to solid-state electronics through extensive lab experiences. Each student will assemble an electronic device using solid-state components. The course will cover use of tools and test equipment, math formulas and tables, and application of electrical theory.

COURSE PREREQUISITES: A minimum of two years of high school math, or a demonstrated competence in math with permission.

Credit: one semester of science credit.

X. BASIC DIGITAL ELECTRONICS ( ) one semester; 2 G-units

This course follows Basic Electronics. It provides an introduction to digital logic circuits used to design calculators and computers. Students will be involved in extensive laboratory experiences, design and manufacture of a digital logic-based electronic device.

COURSE PREREQUISITES: Basic Electronics or instructor's permission.

XI. ENERGY EFFICIENT DESIGN (TE 613) one semester; 2 G-units

This course provides an overview of the processes, materials and tools used in modern energy-efficient construction. This course will cover solar concepts, site selectiion, double wall construction, insulation, heat transfer and heating systems. Each student will participate in the construction of a wood-frame structure.

COURSE PREREQUISITES: Completion of 10th grade.

Cross-over credit: 1/2 year of Scarborough science credit.

IX. ART CRITICISM/PHOTOGRAPHY ( ) One Semester 2 G-units

This course is taught by the Art Department, with a unit in photography taught by the Technology Department. Students will be involved in reviewing works of art, visiting galleries and museums, and shooting and developing black-and-white photographs.

Appendix C

Scarborough Middle School
Technology Education Curriculum Outlines

WENTWORTH MIDDLE SCHOOL 1987 - 1988

GENE CHAPLIN, Industrial Arts & Technology Education

I. PURPOSE

These courses will introduce every sixth, seventh, and eighth grade student to technology education.

II. STRUCTURE

The following three courses are required for all sixth, seventh and eighth grade boys and girls. These courses are offered to every student for one quarter in each of the three years the pupil is in attendance at the middle school level. Class time varies from seven classes for the sixth grade, a high of forty classes for the seventh grade, to thirty-two classes for the eighth grade.

III. COURSE CONTENT

A. SIXTH GRADE COURSE: Novelties Manufacturing

1. AREAS COVERED:

9/14 a. Laboratory safety procedures and introduction to manufacturing a personal accessory

9/22 b. Completion of leather personal accessory and introduction to plastic novelties

9/30 c. Completion of plastic novelty

10/8 - 10/27 d. Manufacturing of wooden household accessory

11/4 e. Manufacturing of metal novelty

2. PROJECTS TO BE COMPLETED:

a. Each student will lay out, cut, form, and assemble a leather product.

b. Each student will sand, finish, and form a plastic product.

c. Each student will decorate, finish, and assemble a metal product.

d. Each student will shape, cut, sand, finish, and assemble a wood product.

3. GOALS:

a. Affective:

* Each student will observe safety precautions when using tools, equipment, and materials.

b. Psychomotor:

* Each student will perform all of the manufacturing functions necessary to produce a variety of novelties.

c. Cognitive:

* Each student will describe lab procedures when entering and leaving.

4. RATIONALE:

This first unit in technology is designed to introduce the beginning sixth grader to a high-success oriented experience. The manipulative tasks involved are fairly easy to perform, even for the most apprehensive personality. Mass-production techniques are employed to allow safe and easy completion of otherwise difficult procedures. This brief overview of manufacturing is intended to stimulate anticipation for their next technology course.

B. SEVENTH GRADE COURSE: Model Race Cars

1. AREAS COVERED:

9/9 - 9/11	a. Laboratory organization and safety procedures
9/14	b. Preliminary sketching
9/15 - 9/21	c. Two-view mechanical drawing
9/22 - 9/23	d. Applied free-hand sketching
9/25	e. Whole and half patterns
9/28	f. Personnel organization
9/29 -9/30	g. Machine use and safety
10/1 - 10/5	h. Mass-production jigs and fixtures
10/6	i. Aerodynamics
10/7 - 10/9	j. Custom manufacturing
10/13 - 10/14	k. Shaping using abrasives
10/15	l. Mechanical friction and lubricants
10/16	m. Drag-scale testing
10/20	n. Race-track function and safety
10/22 - 10/23	o. Design modifications
10/26 - 11/3	p. Final sanding and spraying
11/4	q. Race on computerized race track
11/5 - 11/12	r. Review of racing printout and testing data
11/13	s. Voting for best design

2. PROJECTS TO BE COMPLETED:

a. Each student will choose and role-play a position in our personnel system.

b. Each student will thumbnail-sketch ten different racing car designs.

c. Each student will develop a two-view sketch of his/her favorite design.

d. Each student will mechanically draw a full-scale two-view working drawing, showing all material specifications.

e. Each student will free-hand sketch all body contour lines on this drawing.

f. Each student will make whole and half patterns, using the photocopier.

g. Each student will manufacture a model racing car using both mass-production and custom-production techniques.

h. Each student will experiment in teams to test drag, wheel alignment, inertia performance, and lubricants.

i. Each student will race a car on the computerized raceway.

j. Each student will vote for best design.

3. GOALS

a. Affective:

* Each student will follow lab safety regulations.

* Each student will care for his/her own products and those of others.

* Each student will interact with peers in the solution of problems.

b. Psychomotor:

* Each student will design a racing car for aesthetics and speed.

* Each student will prepare working drawings necessary for production.

* Each student will use materials, tools, and machines efficiently.

* Each student will produce a racing car within the prescribed racing specifications.

c. Cognitive:

* Each student will answer all questions on a comprehensive safety quiz correctly.

* Each student will list in sequence and explain the manufacturing functions.

* Each student will modify a design to make practical use of the principles of aerodynamics.

4. **RATIONALE:**

This unit takes students step by step through problem-solving as it relates to engineering for manufacturing. This process can be used to engineer any product. The basic engineering skills of sketching, mechanical drawing, pattern making and process sequencing will prove to be valuble aids for any student needing to plan and fabricate any article. Model car designing, manufacturing, and racing provides a sound basis for a variety of interdisciplinary activities such as science, computer, math, home economics, etc.

C. EIGHTH GRADE COURSE: Manufacturing Technology

1. AREAS COVERED:

9/9 - 9/10	a. Laboratory organization and safety procedures
9/14	b. Engineering concepts and product criteria
9/15 - 9/18	c. Preliminary sketching
9/22	d. Manufacturing functions
9/23	e. Patterns and rough cutting of stock
9/25	f. Squaring material
9/28	g. Layout and cutting
9/29	h. Shaping and forming
10/1	i. Assembling and finishing
10/2	j. Personnel organization
10/5	k. Bill of materials
10/6 - 11/13	l. Custom manufacturing of products

2. PRODUCTS TO BE COMPLETED:

a. Each student will use mechanical-drawing equipment to do an exercise showing spacial relationships.

b. Each student will write a job description and role-play a position in our personnel system.

c. Each student will write a paragraph describing the product they would like to make and why they want to make it.

d. Each student will complete a lettering exercise to develop neat, uniform, technical-style letters and numerals.

e. Each student will make a preliminary sketch appropriate to the kind of product being produced.

f. Each student will prepare working drawings necessary for accurate layout during fabrication.

g. Each student will compile a bill of materials to compute total cost of product.

h. Each student will list a process sequence for the manufacture of product.

i. Each student will complete practice items relating to the product being made.

j. Each student will manufacture one product.

3. GOALS:

a. Affective:

* Each student will encourage safe practices in others.

* Each student will identify quality workmanship in products.

* Each student will use time effectively when undertaking tasks.

b. Psychomotor:

* Each student will make neat free-hand sketches to design a product.

* Each student will use mechanical-drawing equipment accurately to prepare necessary working drawings.

* Each student will compute product costs precisely.

* Each student will neatly letter and number all engineering sheets.

* Each student will test operational procedures for effectiveness.

* Each student will manufacture a product with the qualities of fine workmanship.

c. Cognitive:

* Each student will answer all questions on a comprehensive safety quiz correctly.

* Each student will list in sequence and describe the concepts of engineering.

* Each student will list a full process sequence for his/her own product, explaining how it will be manufactured.

4. RATIONALE:

In this unit students are limited only by their imagination, lab resources, and time constraints. Students feel a sense of success when they manufacture a product with the criteria set forth by their own sketches, working drawings, and process sequence sheets. Students can capitalize on the basic problem-solving skills in the last unit and see how they cut across the boundaries of a wide variety of materials, tools, equipment, and processes.

IV. EVALUATION

A. GENERAL STANDARD OF ATTAINMENT:

The standards of attainment for manipulative and informative achievement are based upon the level of performance of the grade level as a whole.

B. SYSTEM OF SCORING, GRADING, AND FINAL GRADES:

The system used for the evaluation of the pupils' work is as follows:

4 - A - (93-100) -- best work
3 - B - (85-92) --- above average work
2 - C - (75-84) --- average work
1 - D - (70-74) --- below average work
0 - F - Below 70 -- inferior work or failure

The breakdown of the weight placed on each part of the evaluation is as follows:

The Quarterly Grade

Manipulative work ---------- 33 1/3%
Non-Manipulative work ---------- 33 1/3%
Patterns of Behavior ---------- 33 1/3%

C. GRADING AND SCORING OF "PATTERNS OF BEHAVIOR" CONSIST OF:

Work Habits
Attitude
Cooperation
Initiative
Efficiency

NOVELTIES MANUFACTURING - COURSE OUTLINE

I. Course Description

This is a quarterly course for all sixth graders. The pupil will use wood, metal, leather and plastic to produce as many small products as time will allow.

II. Grading

Grades are based on preparation, accomplishment, completion, and attitude. Their natural enthusiasm, in this brief experience, keeps their grades understandably high.

III. Course Objectives

Each student will:

A. demonstrate simple safety rules.

B. apply the manufacturing functions to produce quality products.

C. explain how much more productive we are if we learn to share and work cooperatively in group.

IV. Course Content

A. Safety
   1. Enter quietly
   2. Sit down quietly
   3. Remain quiet while attendance is taken
   4. No horseplay
   5. Wear apron
   6. Wear eye protection

B. Select Material
   1. Leather
   2. Plastic
   3. Wood
   4. Metal

C. Layout
   1. Template
   2. Awl

D. Cut
   1. Hollow punch
   2. Drill

E. Shape
   1. Abrasives
   2. Router

F. Form
   1. Lettering punches
   2. Stripbender

G. Assemble
   1. Snaps
   2. Rivets
   3. Glue
   4. Adhesive

H. Finish
   1. Plastic solvent
   2. Danish oil finish
   3. Thermal enameling powder

MODEL RACE CARS - COURSE OUTLINE

Wentworth Middle School

I. Course Description

This is a quarterly course for all seventh graders. It is clearly the most motivating unit I have ever taught. It mirrors man's obsession with the automobile. This course emphasizes problem-solving as it relates to automobile design, manufacture, and high-speed racing.

II. Grading

Manipulative work ----------33 1/3%
Non-manipulative ----------33 1/3%
Patterns of Behavior ----------33 1/3%

III. Course Objectives

Each student will:

A. select a job and participate in a personnel system.

B. experiment in a team with the principles of technology that apply to the design and efficiency of the racing car.

C. brainstorm ten different thumbnail sketches of possible designs for a racing car.

D. select a favorite design and develop it into a preliminary two-view sketch.

E. mechanically draw a full-scale two-view drawing of their car.

F. manufacture their racing car according to their own engineering specifications.

G. experiment in teams to test drag, wheel alignment, and inertia performance.

H. race car on the computerized raceway.

IV. Course Content

A. Safety
1. Enter quietly
2. Sit down quietly
3. Remain quiet while attendance is taken
4. No horseplay
5. Wear apron
6. Wear eye protection

B. Forms of ownership
1. Sole proprietorship
2. Partnership

C. Personnel organization
1. Line organization
2. Line and staff organization

D. Production methods
1. Custom production
2. Mass production

E. Engineering functions
1. Product ideas
a. Technological situation (problem)
2. Analysis and investigation
a. Wind-tunnel experiments with sample cars.
b. Drag-scale experiments with sample cars.
c. Mechanical friction and lubrication experiments.
3. Preliminary sketches
a. Thumbnail sketches
b. Two-view sketch
4. Working drawings
a. Two-view mechanical drawing
b. Whole and half patterns

F. Manufacturing functions
1. Select material
a. Pre-cut wooden wedge
b. Screw eyes
c. Plastic straw
d. Axles
e. Washers
f. Wheels
g. Graphite

2. Layout
   a. Pencil
   b. Rules
   c. Squares
3. Cut
   a. Razor knife
   b. Scissors
   c. Drilling jig
   d. Scroll saw
   e. Band saw
4. Shape
   a. Stationary belt sander
   b. Disc sander
   c. Drum sander
   d. Files
   e. Abrasive cloth
   f. Abrasive paper
5. Assemble
   a. Masking tape
   b. Bench vise
   c. Clamps
6. Finish
   a. Danish oil finish
   b. Air brush
   c. Pin striping
   d. Numbering
7. Test
   a. Drag-scale test
   b. Wheel-alignment test
   c. Inertia-performance test

G. Race
   1. Watch race.
   2. Attach car to track.
   3. Load engine.
   4. Position car in the starting gate.
   5. Operate computer to start race.
   6. Race in two heats.

H. Vote on best design.

MANUFACTURING TECHNOLOGY - COURSE OUTLINE

Wentworth Middle School

I. Course Description

This is a quarterly course for all eighth graders. In this course students are limited only by their imagination, lab resources, and time constraints. This course allows students to select their own unique problem and solve it in a group engineering process.

II. Grading

Manipulative work ----------33 1/3%
Non-manipulative work ----------33 1/3%
Pattern of Behavior ----------33 1/3%

III. Course Objectives

Each student will:

A. feel a sense of success when they manufacture a product with the criteria set forth by their own sketches, working drawings, and process sheets.

B. participate in a group activity for developing a system for laboratory organization.

C. share in a student-managed safety system.

D. use problem-solving techniques that cut across the boundaries of a wide variety of materials, tools, equipment, and processes.

E. use the language of industry to communicate individual ideas to other students on a regular basis.

F. recognize and use the principles of technology and the mathematics associated with them.

IV. Course Content

A. Safety
   1. Enter quietly
   2. Sit down quietly
   3. Remain quiet while attendance is taken
   4. No horseplay
   5. Wear apron
   6. Wear eye protection

B. Forms of ownership
   1. Sole proprietorship
   2. Partnership
   3. Corporation
C. Personnel organization
   1. Line organization
   2. Line and staff organization
D. Production methods
   1. Custom production
   2. Mass production
E. Engineering functions
   1. Product ideas
      a. Household accessories
      b. Workshop tools and accessories
      c. Novelties
      d. Personal accessories
      e. Technological situation (problem)
   2. Preliminary sketches
      a. Oblique sketches
      b. Isometric sketches
   3. Working drawings
      a. Whole, half, quarter patterns
      b. Sheet metal stretch-outs
      c. Models
      d. Templates
   4. Bill of Materials
      a. Quantity description
      b. Part description
      c. Material description
      d. Size description
      e. Number of units
      f. Unit cost
      g. Total cost
      h. Overhead cost
   5. Production guides
      a. Operation number
      b. Part numbers
      c. Manufacturing functions
      d. Section or part of product being affected
      e. Tools and/or materials used
F. Manufacturing functions
   1. Select material
      a. Wood
      b. Metal
      c. Plastic
      d. Leather
   2. Layout
      a. Pencil
      b. Rules
      c. Squares
      d. Compasses
      e. Sheet metal gauges
      f. Awls and scribers

3. Cut
   a. Scissors
   b. Hand saw
   c. Miter box
   d. Tin snips
   e. Chisels
   f. Hand drill
   g. Bit brace
   h. Portable electric hand drill
   i. Scroll saw
   j. Band saw
   k. Razor knife
   l. Hollow punch
4. Shape
   a. Hand plane
   b. Surface planer
   c. Disc sander
   d. Drum sander
   e. Stationary belt sander
   f. Portable belt sander
   g. Orbital sander
   h. Files
   i. Abrasive cloth
   j. Abrasive paper
5. Form
   a. Box and pan brake
   b. Hand seamer
   c. Strip bender
6. Assemble
   a. Masking tape
   b. Bench vise
   c. Clamps
   d. Glue
   e. Nails
   f. Wood screws
   g. Spot welder
   h. Pop rivets
   i. Sheet metal screws
   j. Solder
   k. Leather rivets
   l. Leather snaps
   m. Stitching awl
7. Finish
   a. Stains
   b. Danish oil finish
   c. Hard film finish
   d. Air brush
   e. Buffer
   f. Leather tooling punches

8. Inspect
   a. Self-evaluation
   b. Personnel organization approvals
   c. Instructor's approval

G. Distribution functions
   1. Package
   2. Ship
   3. Sell

Appendix D

"Science and Technology" Course Curriculum Outline

V. UNITS - TECHNOLOGY

A. COMMMUNICATIONS I: Drafting/Design. (4 weeks)

1. AREAS COVERED:

9/8 a. Measurement using scale. 1/16's, 1/8's, 1/4's.

9/9 b. Use of architect's scale.

9/10 c. Drafting instruments.

9/11 d. Reading technical drawings.

9/12 e. Sketching freehand.

9/15 - 9/16 f. Three view drawing.

2. PROJECTS TO BE COMPLETED:

9/17 - 9/19 a. Top view of scale model foundation to be constructed later.

9/29 - 10/1 b. Full section elevation of scale model drawn to scale of 1/2" = 1'.

10/2 c. Traced copy of elevation on vellum.

10/3 d. Diazo copy of elevation.

3. GOALS:

a. Affective:

* Students will use drafting instruments appropriately.

* Students will treat other students and instructor with respect.

* Students will listen to presentations.

Curriculum - **SCIENCE AND TECHNOLOGY**

SCARBOROUGH HIGH SCHOOL 1986 - 1987

DAN ABBOTT, Technology Education ALAN MORSE, Science

I. PURPOSE

This course is designed to teach both science principles and their applications in an integrated course. It is intended for freshmen.

II. STRUCTURE

The course will be taught by one science and one technology instructor during two consecutive 45 minute periods. There will be some flexibility in scheduling between the two sections, with classes combined into one 90 minute block for special projects, speakers, or field trips.

III. GRADING

Students will receive one grade per quarter for this double-period course and will earn two science credits upon successful completion. Weighted grades will be earned in five areas: projects, tests and quizzes, homework, class performance, and completion of notebooks. Weightings and criteria are described in section VI.

IV. COURSE CONTENT

The instructors for this course will integrate class and lab work both within and between sections. Students will encounter written and oral work as well as projects in both the technology and the science segments. The following pages contain the technology and science curriculum outlines. These subheadings will be found under each unit description:

1. Areas covered,
2. Projects to be completed,
3. Goals (affective, psychomotor, and cognitive),
4. Guest speaker/field trip possibilities,
5. Rationale.

Technology outline pages appear on the left and science pages appear on the right. The list below summarizes the eight course units described in section V.

Unit	Technology	Science	page
Communications I	drafting/design	information transfer	2
Construction	wood framing	forces and systems	6
Communications II	graphic arts	light and color	10
Communications III	musical instruments	sound	14
Energy I	house design	heat	18
Energy II	electricity	sources of energy	22
Power and Mechanics	engines	forces and motion	28
Special Projects	----------	combined unit	32

V. UNITS - **SCIENCE**

A. **COMMUNICATIONS I**: Information Transfer (4 weeks).

1. AREAS COVERED:

9/8 - 9/9 a. Verbal/spatial brain differentiation.

b. Science study skills: whole brain thinking.

9/10 - 9/12 c. Copying, enlarging, and reducing drawings.

9/15 - 9/17 d. Interpreting measurements, scales.

e. Conversion of units (scales and rates), dimensional analysis.

9/18 - 9/19 f. Remote measurement: similar triangles.

9/29 - 9/30 g. Types of waves.

10/1 - 10/3 h. Electromagnetic spectrum--refraction and dispersion.

i. Photosensitive materials--diazo copying.

2. PROJECTS TO BE COMPLETED:

9/10 - 9/12 a. Three copies of line drawings: to same scale, enlarged, and reduced.

9/19 - 9/23 b. Scale drawing of section of outside wall of school or contour map of hill between the parking lot and playing fields.

9/24 - 9/25 c. Aerobie--cardboard version created from scale drawing.

3. GOALS:

a. Affective:

* Students will demonstrate knowledge and appreciation of individual differences.

* Students will show confidence in drawing ability.

* Students will take responsibility for individual work in group assignments.

b. Psychomotor:

* Students will complete drawings to standards set by instructor.

* Students will letter drawings to standards set by instructor.

c. Cognitive:

* Each student will name drafting instruments used to complete drawings.

* Each student will describe the process of making diazo, white-prints.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. Surveyor.

b. Drafting office.

c. Architect's office.

d. Engineering firm.

5. RATIONALE:

The ability to read prints and to understand spacial concepts is important in many industries. A unit on drafting and design exposes students to an important occupational area and prepares them for the next unit on construction. The drawings they do in this unit will be used in the construction of their corner sections.

b. Psychomotor:

* Students will display eye-hand coordination in copying drawings.

* Students will draw elevations accurately.

* Students will produce a flying Aerobie.

c. Cognitive:

* Students will use spatial abilities to aid verbal comprehension.

* Students will master a dimensional analysis problem-solving format.

* Students will master the simple geometry of similar triangles.

* Students will diagram and label the electromagnetic spectrum.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. Expert on navigation techniques.

b. Several days outdoors working on drawing, mapping, and Aerobie projects.

5. RATIONALE:

The first subjects covered in this unit are designed to promote positive attitudes by demonstrating how each individual processes information in a different way. Students will learn some simple tricks for enlisting thought processes usually unused in drawing and in solving unit conversion problems . Later work in this unit, the section on waves and the electromagnetic spectrum, provides direct support for the drawing and print-making of the technology component while introducing some basic concepts of science.

B. **CONSTRUCTION:** Wood Framing (10 WEEKS).

1. AREAS COVERED:

10/6 - 10/10 a. General tool and machine safety.

10/14 - 10/17 b. Safe operation of specific machines.

10/20 - 10/24 c. Wood characteristics and lumber sizes.

10/27 - 11/7 d. Foundation principles and construction of model corner section foundation.

11/10 - 11/21 e. Floor framing principles and construction of floor of corner section.

11/24 - 12/5 f. Wall framing and construction of three walls of corner section.

12/8 - 12/19 g. Roof framing, truss construction and completion of corner section.

2. PROJECTS TO BE COMPLETED:

a. Each student will set up and operate radial arm saw, circular saw, jointer, planer, and sanders and use all appropriate hand tools.

b. Each student will complete a corner section model of a wood frame house at 1"=1' scale.

3. GOALS:

a. Affective:

* Students will observe all safety requirewhen in the shop, operating machines, assisting others, or observing demonstrations.

* Students will cooperate with each other in completing the tasks required.

B. **CONSTRUCTION**: Forces and Systems (10 weeks).

1. AREAS COVERED:

10/6 - 10/17 a. Study skills: mapping.

10/8 - 10/17 b. Safety at home and in the workplace.

10/14 - 10/24 c. Soils: load bearing, drainage, biological function, erosion.

d. Waste water disposal.

10/27 - 10/31 e. Foundations:

* Function of footings.

* Effects of frost.

* Drainage.

11/3 - 11/6 f. Wood:

* Maine's lumber and pulp industry.

11/7 - 11/18 * Growth and cell structure.

11/19 - 11/21 * Shear, compressive, and tensile strength.

11/24 - 12/5 g. Floor and roof framing: loads and deflection.

12/8 - 12/19 h. Trusses and bridges.

2. PROJECTS TO BE COMPLETED:

10/6 - 10/17 a. Set of "maps" of shop safety.

11/3 - 11/6 b. Interview with someone who works with wood.

12/8 - 12/19 c. Soda straw bridge(s): for load testing.

3. GOALS:

a. Affective:

* Students will complete projects outside of the classroom.

b. Psychomotor:

* Each student will make accurate measurements and cuts, and operate machines and hand tools correctly.

* Each student will produce a corner section that meets standards of quality set by instructor.

c. Cognitive:

* Each student, when tested, will properly sketch a full elevation of the corner section and correctly name 90% of the parts studied.

* Each student will correctly answer all questions contained in a general safety test before working in the lab.

* Each student will correctly answer 85% of the questions on individual machine safety tests before using specific machines.

* Each student will demonstrate an understanding of the application of the 3-4-5 triangle rule.

* Each student will earn a passing grade on a comprehensive unit exam.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. Carpenter/builder.

b. Site of the construction of a wood frame house.

c. Wood Structures truss company in Biddeford.

5. RATIONALE:

This unit provides students with an opportunity to develop safe work habits, an understanding of the characteristics of wood, and an understanding of the process of constructing a wood frame house. This process will improve problem solving and organizational skills, increase familiarity with a large and important industry, and provide useful life skills to future homeowners.

b. Psychomotor:

* Students will manipulate small objects and work together in projects which require more than two hands.

c. Cognitive:

* Students will create "maps" of verbal or written material.

* Students will describe connections between their homes and the natural world.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. Occupational safety expert.

b. Forester.

c. Construction site at time of soils test.

d. Construction site to view foundation and footings.

e. Construction site at time of septic system installation.

f. Sewage treatment plant.

g. Lumber mill.

h. Maine Audubon solar headquarters building.

5. RATIONALE:

In this unit we study the house in its context, describing it as a complex machine whose functions are not just contained within its walls. We begin a study of community systems, which will be continued throughout the rest of the course. Here, we examine sources of construction materials and the direct biological effects of housing on the site. In addition, the house frame is discussed as a complex physical system. Students will begin to see their own actions in a wider social and environmental context, a viewpoint which will become increasingly important to them in minimizing their own negative impact on a stressed society and in using personal resources wisely.

C. COMMUNICATIONS II: Graphics Arts. (3 weeks)

1. AREAS COVERED:

1/5 -1/9 a. Overview of graphics processes: screen, offset, photo, relief, electrostatic, intaglio.

b. Basic principles of design.

1/12 - 1/16 c. Screen printing process in detail.

1/19 - 1/23 d. Black and white photography.

2. PROJECTS TO BE COMPLETED - each student will:

a. design a T-shirt or poster logo, make a hand-cut or photo screen, and produce a final product or:

b. shoot and develop a roll of black and white film.

3. GOALS:

a. Affective:

* Each student will produce a design that falls within thematic limits set by the instructor.

* Each student will use necessary chemicals safely as prescribed by instuctor.

b. Psychomotor:

* Each student will properly cut film emulsion without damaging plastic backing or leaving fingerprints on the emulsion.

* Each student will successfully use developing equipment to wind and process black and white film.

c. Cognitive:

* Each student will earn a passing grade of 70% or higher on a unit test.

C. **COMMUNICATIONS II**: Light and Color (3 weeks).

1. AREAS COVERED:

1/5 - 1/13 a. Basic optics.

1/15 - 1/21 b. Color.

1/22 - 1/23 c. Chemical safety.

2. PROJECTS TO BE COMPLETED:

1/12 a. Construction of pinhole camera.

1/13 - 1/14 b. Exposed and developed picture taken with pinhole camera.

1/22 - 1/26 c. Inventory of household chemicals and use guidelines.

3. GOALS:

a. Affective:

* Students will use physics laboratory equipment responsibly.

b. Psychomotor:

* Students will develop proficiency at working in the dark by touch.

c. Cognitive:

* Students will describe how light moves and why we see color.

* Students will find and interpret warning labels, interpreting health effects of chemicals.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

   a. A professional photographer.

   b. A printing company that does offset or screen printing.

   c. A photogrphic processing plant.

5. RATIONALE:

   The graphics industry is one of the fastest growing occupational areas. Graphics offers excellent opportunities for career exposure and development of design skills and motor skills. It also offers many excellent opportunities to teach important science principles.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

   a. Poison control specialist.

   b. Printing plant.

5. RATIONALE:

   This unit gives students the opportunity to investigate two of their senses--sight and touch. Much of how we perceive the world is affected by the behavior of light. In the absence of light, as in a darkroom loading, unloading, and developing film a from pinhole camera, we must learn to rely heavily on other senses.

   While working with chemicals in the darkroom we will have the opportunity to talk about chemical safety. Many of these students will work with chemicals in their jobs, and few adults appreciate the dangers of long-term exposure to toxins.

D. **COMMUNICATIONS III:** Music (two weeks).

1. AREAS COVERED:

2/2 - 2/11 a. Musical instrument design and construction.

2/12 - 2/13 b. Electronic sound enhancement.

2. PROJECTS TO BE COMPLETED:

a. Each student will research and build a prototype of a wind, stringed, or percussion instrument.

b. All students will participate in a field trip to a recording, radio or television studio in the Portland area.

3. GOALS:

a. Affective:

* Each student will cooperate with other students and with instructor in selecting and constructing prototypes.

* Each student will engage in basic research necessary to construct the instrument.

b. Psychomotor:

* Each student will accurately measure parts required for the instrument made.

c. Cognitive:

* Each student will properly identify all prototypes as strings, wind or percussion.

* Each student will correctly identify the gain, bass, treble, midrange and reverb functions of a basic sound mixing board.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. A professional rock musician.

b. A recording studio in Portland such as Studio 3 or Megaphone.

c. An instrument maker in the Scarborough area.

D. **COMMUNICATIONS III:** Sound (2 weeks).

1. AREAS COVERED:

2/2 a. Nature of sound.

2/3 - 2/6 b. Why and what we hear.

2/9 - 2/13 c. Physics of music.

2. PROJECTS TO BE COMPLETED:

2/9 - 2/13 a. Resonance tubes.

b. Single stringed instrument.

3. GOALS:

a. Affective:

b. Psychomotor:

* Students will coordinate hand movements with the fundamentals and overtones they hear.

c. Cognitive:

* Students will draw different modes of a vibrating string.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. Guitar player.

b. Professional sound studio.

5. RATIONALE:

Music is a communication form of great interest to students. The process of making various forms of musical instruments involves both math calculations and a basic understanding of the physics of sound. In addition, the area of sound enhancement, which is vital to the music industry, provides an opportunity to introduce elements of electronics through a popular form of music - rock and roll.

5. RATIONALE:

In a meeting at the end of the 1985-86 school year, the future students of this class identified this subject as one of particular interest to them. We will use this topic to investigate a third sense, the sense of hearing, and to study the physics of sound waves. In learning more about sound, students will find themselves hearing more in their favorite music and appreciating some of the subtlties of this means of communication.

E. ENERGY I: HOUSING DESIGN (2 weeks).

1. AREAS COVERED:

2/23 - 2/25 a. Glazing orientation.

2/26 b. Insulation.

2/27 c. Air infiltration.

3/1 d. Heat flow.

3/2 e. Window construction.

3/3 - 3/4 f. Energy auditing.

3/5 g. Heating sources.

3/5 h. Air to air heat exchanger.

2. PROJECTS TO BE COMPLETED:

a. Each student will prepare a basic site plan showing orientation of a passive solar house.

b. Students will insulate a portion of their corner section to show proper technique.

3. GOALS:

a. Affective - N/A.

b. Psychomotor - N/A.

c. Cognitive.

* Each student will identify the orientation required for maximum solar gain.

* Each student will identify various insulating materials by their approximate R-values.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. Stephen Tewhey.

b. Construction sites of double wall, passive solar and CMP "common cents" homes.

c. Existing earth bermed and passive solar homes.

E. **ENERGY** I: Heat (three weeks).

1. AREAS COVERED:

2/23 - 2/25 a. Convection, conduction, and radiation.

2/26 - 2/27 b. Techniques of insulation.

3/2 - 3/4 c. Basic astronomy and solar site design.

3/9 - 3/13 d. Solar heating.

2. PROJECTS TO BE COMPLETED:

3/11 - 3/13 Solar collector.

3. GOALS:

a. Affective:

* Students will work in teams and cooperate to reach a common goal.

b. Psychomotor:

c. Cognitive:

* Students will explain the difference between the three types of heat transfer and identify examples.

* Students will describe ways to decrease each type of heat loss from a building.

* Students will demonstrate techniques for maximizing net solar gain.

4. GUEST SPEAKERS/FIELD TRIP POSSIBILITIES:

a. Architect.

b. Time outdoors to measure solar elevation.

c. Planetarium.

5. RATIONALE:

Understanding the energy efficiency requirements of single family homes requires some understanding of important thermal concepts, materials characteristics, and planetary movement. An appreciation of the need for energy conserving construction of all homes, and energy retrofits of existing homes may affect students future housing decisions in a positive way.

5. RATIONALE:

Although energy prices are relatively low now, they are likely to soar again before the end of the decade. The students in this class will live through an era of decreasing fuel supplies and increasing prices. Thus, it is important for them to understand how they might conserve energy. In this area, a large portion of our energy goes into space and water heating and much time in this course has been given to studying single family houses, so this unit will focus on heating homes.

F. ENERGY II: Electricty and wiring. (4 weeks)

1. AREAS COVERED:

a. Theory:

3/9	Atomic structure.
3/10 - 3/11	Electrical terms.
3/12 - 3/13	Six methods of generating electricity.
3/16	Series and parallel circuits.
3/17 - 3/18	Ohm's law and power formula.
3/19	Total resistance in circuits.
3/19	Affect of current flow on muscles.

b. House wiring:

3/23 - 3/24	Safety.
3/25	Types of conductors.
3/26 - 3/27	Proper wiring techniques.
3/30	Circuit protectors.
3/30	Ground fault current protection.
3/31 - 4/3	Duplex wiring.
4/3	Three way switch wiring.

2. PROJECTS TO BE COMPLETED:

a. Each student will sketch diagrams of basic duplex circuits.

b. Each student will wire one duplex outlet and one switch into a box in a 2x4 wall section.

c. Each student will wire a circuit containing two three way switches.

F. **ENERGY** II: Sources of Energy (3 weeks).

1. AREAS COVERED:

3/16 - 3/17 a. History of energy use.

3/17 - 3/19 b. Present energy consumption.

3/23 - 3/25 c. Present sources of energy.

d. Generating electricity.

3/25 - 3/27 e. Possible future sources.

2. PROJECTS TO BE COMPLETED:

3/18 - 3/19 a. Home energy use inventory.

3/30 - 4/3 b. Library research report on a source of energy.

3. GOALS:

a. Affective:

* Each student will demonstrate appropriate attitude toward the dangers of electricity.

* Each student will complete the projects neatly within the standards set by the instructor.

b. Psychomotor:

* Each student will properly manipulate the tools necessary to cut and bend electrical wire, and to wire electrical devices.

c. Cognitive:

* Each student will correctly identify five of the six methods of generating electricity.

* Each student will earn a grade of 100% on a basic electrical safety test.

* Each student will give the correct memory device for Ohm's law and the power formula.

* Each student will explain the danger of purposely by-passing circuit protection devices.

* Each student will earn a passing grade of 70 % on a comprehensive exam over material covered.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. Electrical wiring code officer.

b. Residential construction site.

c. Cousins Island Generating Plant.

d. Hydro-electric plant.

3. GOALS:

a. Affective:

* Students will identify, research, and present a project on a source of energy.

* Students will listen respectfully to each other's presentations.

b. Psychomotor:

c. Cognitive:

* Students will describe methods of converting raw energy resources into usable forms.

* Students will identify sources and quantify applications of energy in their lives.

* Students will describe the origins of our energy crisis.

* Students will compare methods of conserving energy in the community.

* Students will identify and evaluate possible future sources of energy.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. State Board of Environmental Protection member.

b. Cousins Island oil-fired generating station.

c. Dayton Hydroelectric Plant.

5. RATIONALE:

An understanding of basic electricity is valuable for a number of reasons. It forms the basis for an understanding of electronics, it is an important industry, and it is an area that many homeowners will deal with. Since electricity can be a serious hazard, appreciation of safety requirements might actually be a lifesafer. The area also offers interesting opportunities to teach atomic concepts, and other key concepts of physics.

5. RATIONALE:

As consumers of energy in the Northeast, these students will bear the brunt of energy price increases in their lifetimes. They will be asked to choose between cheap energy and a clean environment and will also be faced with personal financial choices. This unit is designed both to give students some of the grounding they need to act as intelligent citizens and to help them learn to investigate a question and present facts and opinions, orally and in writing. This energy project will also act as a practice run for the special research project at the end of the fourth quarter (section H).

G. POWER AND MECHANICS: (six weeks).

1. AREAS TO BE COVERED:

4/6	a. Simple machines.
4/7 - 4/8	b. Work, power, force.
4/9	c. Horsepower.
	d. Mechanical advantage.
4/13	e. Internal and external combustion engines.
4/14 - 4/15	f. Four cycles of automobile engine.
4/16	g. Carburation and Bernouli's law.
4/17	h. Fuel, timing, exhaust, ignition and cooling system theory.
4/27 - 5/1	i. Precision measuring with micrometers and vernier calipers.
5/4	j. Torque wrench use.
5/5 - 5/8	k. Parts of a lawnmower engine.
5/11 - 5/22	l. Completion of disassembly and reassembly.

2. PROJECTS TO BE COMPLETED:

a. Each student will completely disassemble a four cycle lawn mower engine.

b. Each student will make precision measurements of valve stems, cylinder size, ring clearance and wrist pins.

c. Each student will reassemble the small engine.

3. GOALS:

a. Affective:

* Students will observe safety rules and cooperate with others in completion of of projects.

* Students will use tools correctly.

G. **POWER AND MECHANICS**: Forces and Motion (6 weeks).

1. AREAS COVERED:

4/6 - 5/15	a. Work and mechanical advantage.
4/7 - 4/15	b. Levers.
4/15 - 4/17	c. Wheels and axles.
4/27 - 5/1	d. Pulleys and gears.
5/4 - 5/6	e. Inclined planes and wedges.
5/6 - 5/8	f. Screws.
5/11 - 5/12	g. Friction and efficiency.
5/13 - 5/15	h. Energy, force, and power.
5/18 - 5/19	i. Velocity and acceleration.
5/19 - 5/21	j. Acceleration of gravity, Newton's laws.

2. PROJECTS TO BE COMPLETED:

4/7 - 5/8	a. A lab on each of six simple machines.
5/11 - 5/22	b. List and description of the simple machines which make up a four cycle lawn mower engine.

3. GOALS:

a. Affective:

* Students will direct themselves through simple machines labs, following written lab directions.

* Students will complete their engine simple machine lists.

b. Psychomotor:

* Each student will make accurate precision measurements.

* Each student will use wrenches, sockets, torque wrenches and other tools correctly in making adjustments on engines.

c. Cognitive:

* Each student will identify and compare internal and external combustion engines.

* Each student will correctly demonstrate four cycles in a small engine.

* Each student will name 10 of the 15 major parts of a small 4 cycle engine.

* Each student will receive a passing grade of 70% or higher on a comprehensive exam over the material covered.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

a. An auto racing engine specialist.

b. An auto fabrication shop, such as HiTech Fabrication.

c. An auto or small engine repair facility.

5. RATIONALE:

Power and mechanics are central to the transportation and manufacturing industries. Both remain essential occupational elements of the U.S. economy. In addition nearly every student will eventually operate and own a motor vehicle of some kind. A fundamental understanding of its power plant may make them better consumers of both vehicles and vehicle service. This area also provides many opportunities for teaching related physics concepts of mechanics.

b. Psychomotor:

* Students will manipulate small parts to lab equipment and coordinate their efforts with their lab partners.

c. Cognitive:

* Students will name all the simple machines and calculate their mechanical advantage.

* Students will identify the simple machines which form parts of the lawn mower engine.

* Students will relate efficiency to energy use.

* Students will calculate trip velocities, times, and distances.

* Students will predict the behavior of falling objects.

4. GUEST SPEAKER/FIELD TRIP POSSIBILITIES:

Boston Museum of Science.

5. RATIONALE:

An understanding of simple machines will not only help students in any mechanical endeavor, but can also help their understanding of the workings of their own bodies. Muscles and bones working as simple machines work well as long as they are used intelligently.

In order to understand any physical system one must have an intuitive grasp of velocity, acceleration, force, work, energy, and power. We are living in a physical world and must make the best of it. If we understand the laws which make things move and act upon each other we become more effective in our physical efforts.

H. SPECIAL PROJECTS:(three weeks.)

5/26 - 6/12 This period will be devoted to individual projects requiring students to do some field research, and some library research into a current problem in the Scarborough community that requires a technological solution. Possibilities include zoning, waste treatment, water quality, energy use of public buildings, power generation and others.

Specific project selection will be made by students with the assistance of instructors.

VI. EVALUATION:

A. PROJECTS: 40%.

Each project completed by students will be evaluated using a written form which will be provided before project is started. Each form will include both student and instructor evaluations.

This course is based upon applications. Therefore, projects will account for the single greatest portion of final grades.

Copies of evaluation instruments are included in appendix.

B. TESTS: 20%.

Short quizzes will be given frequently and tests will be given for each unit to determine the effectiveness of instruction and to demonstrate that students in this course are learning science and therefore earning science credits.

Copies of sample tests and quizzes are included in the appendix.

C. HOMEWORK: 15%.

Homework will be given in the form of worksheets and some handouts to reinforce classroom work. Homework contributes 15% to earned grade to reflect the applications basis of this course.

D. PERFORMANCE: 15%.

Affective goals are very important in this course, and are closely related to work skills students must have when they graduate. Each student will begin each quarter with a full 15 performance points toward the final grade. Points will be deducted during that quarter for unsafe behavior, repeated disrespectful behavior toward other students, repeated tardiness, failure to make up work missed because of absences, and repeated violations of clearly presented classroom rules.

E. NOTEBOOKS: 10%.

Each student will be required to keep a notebook containing all safety sheets and safety tests, and a log of activities with daily entries. This will be done for each of the two instructors.

Notebooks are required in this course for several reasons. It is necessary to maintain evidence that adequate safety instruction was given to students. Notebooks provide a record of each student's participation in lab activities. Notebooks also help student develop organizing and study skills.

Appendix E

"Publications Writing"
Course Summary, Curriculum Outline,
Sample Course Materials

Publications Writing - Summary
Scarborough High School

I. Introduction.

This course was developed using funds granted by the State of Maine under the Carl Perkins Vocational Education Act. One of the goals of this project was the development of greater integration between technology education and other subject areas of the high school. This course in publications writing is an excellent example of such an integration.

The TEAMS project advisory committee developed a list of student needs that should be addressed in designing technology courses. The advisory committee also recommended that a number of integrated, interdisciplinary courses be developed, including this course in publications writing.

II. Course design.

The course is offered as a joint English/technology education course, with one semester English credit and one semester fine arts credit. It is taught by two teachers, both of whom are present for all class meetings. It is designed to provide students with development of writing skills and a technical understanding of the publishing area of communications.

III. Production of newspaper.

A. Student responsibility.

Students are responsible for all phases of the production of 12 to 14 issues of the school newspaper. They must write, solicit, edit, proofread, and typeset all articles. They must generate all graphics, including photographs, clip art, cartoons, borders, and lines. They must prepare paste-ups, camera-ready copy, and offset plates. They must print, fold, finish, and distribute all papers. They must respond to all letters and other comments, both supportive and critical.

These responsibilities require a considerable amount of time spent after school, in addition to class time. Class time includes course elements that do not contribute directly to the production of the paper.

B. Turn-around time.

Because the class does all elements of the paper, it is printed in a very timely fashion with 1 to 6 days of lag time between events being reported and the distribution of the paper itself. This means that the school population is much more likely to read the paper.

C. Typesetting.

The generation of text copy is done by computer, using AppleWorks word processing. Other software was considered for this aspect, including some that could combine graphics with text, and one that could format columns and import AppleWorks files as ASCII. None turned out to be suitable.

It is the intent of the instructors that this course engage in what is known as "desk-top publishing." The best software available for this purpose requires either IBM-type computers or Apple Macintosh computers, neither of which are available to us. Of the software available for the Apple IIe and IIGS, none is effective enough to replace AppleWorks printouts which are pasted-up by hand.

We have tried MultiScribe 2.0, and GraphicWriter, both in the latest versions designed for the IIGS. Both are effective word processors. However, both have unacceptable limitations for this course. They print out very slowly, although they do offer some different fonts and sizes. As a result, they are poor substitutes when the copy must be hand pasted. If they were capable of organizing AppleWorks files into a newspaper format easily, the slow print-out would be acceptable. However, the process required to do this is tedious, and the results have not been satisfactory.

It is hoped that software similar to the Pagemaker program available for Macintosh and other systems will be developed for the IIGS. Such a program would go a long way toward providing true desk-top publishing, particularly if AppleWorks files could be imported into columns. In the meantime, the acquisition of the Timeout series of AppleWorks add-on programs has greatly enhanced AppleWorks for our purposes, allowing a wide variety of Macintosh fonts, a spell checker, and other useful features.

D. Copy preparation.

This course is possible only because of the acquisition under the grant of a used Minolta electrostatic copier. It is used to enlarge and reduce copy, to make a camera-ready copy, and to transfer the image to a direct-image paper offset plate. Without an electrostatic copier in the classroom, all copy preparation would have to be done outside of class by the instructors, using the office copier. This machine puts the entire production of the school newspaper into the hands of students.

E. Photographs.

Although the method of making plates limits our photographic quality, several satisfactory methods of creating photographs have been developed.

1. Half-toned Polaroid instant photos.

This process took some time to perfect, but in issue number eight, the photos look quite good. An older Polaroid camera with bulb flash is used with 107 black-and-white film, ASA 3000. An offset screen is inserted into the film pack prior to shooting, creating a half-toned print. To reproduce electrostatically and from the direct-image plate, the print must be very light. This requires a setting of ASA 300, indoor/no flash on the camera that we have.

2. High contrast black-and-white.

This involves printing a standard black-and-white print onto multi-contrast paper with a number 4 filter. The resulting print is of fair quality when printed with the offset press.

3. Video digitized image.

We now have the capability of digitizing a video image and reproducing it on a dot matrix printer. Although the results are only fair, it does provide a recognizable image.

F. Editorship.

Each of the students in the course will have the opportunity to edit at least one issue of the paper. This experience is so valuable that the instructors decided that each student should have the opportunity even if the number of issues of the paper must be increased. The result is that 14 issues of the paper will be published. This clearly requires that some adjustments be made in other planned activities.

G. Printing.

The school system owns a 20-25-year-old, second-hand AB Dick offset duplicator, model 320. Although the quality of reproduction is not high, it does an adequate job of printing for this purpose. AB Dick direct-image paper masters are used. The image is placed on the plate electrostatically using a plain paper copier.

IV. Planning based upon determination of needs of youth.

The needs of youth statement developed by the advisory committee was used as a basis in planning the activities of this course. Specifically, the following needs are addressed by this course:

A. Success in social and learning environment of school.

The students clearly feel a sense of success from producing a product that is a highly visible and key component of the school. The paper is read by the majority of students and faculty, with favorable comments coming both verbally and in writing from both groups.

B. Development of self-esteem.

This project allows individual students in the class and outside the class to use their varying abilities to contribute to a school function. The class is a very mixed group of students, each of whom has written important articles. The instructors have made an effort to broaden the appeal of the paper by including articles about activities as varied as stock car racing, hunting, student rescue, academic decathalon and school sports. The Senior Spotlight has focused on students with a range of backgrounds and interests. These things foster respect for all students.

C. Discovery and development of individual talents.

Because all jobs on the paper rotate, each student has an opportunity to discover writing, graphic design, press operation, business management, organization, and other talents.

D. Adapt to change.

The varying jobs from issue to issue of the paper provide significant experience in adapting to change. The focus of the course is on general skills development among the many activities necessary for production.

E. Apply principles studied throughout the curriculum to new situations.

The school paper is a real-world activity. Students bring their knowledge of writing, content, math, and organization--all gained throughout their school careers--to this real-world activity.

F. Develop lifelong learning skills.

The ability to seek out, recognize, and utilize resources which can be used to get information is developed by each student as they write articles to be submitted for publication. These are the kinds of skills that allow people to continue learning long after they leave formal schooling.

G. Develop problem-solving skills.

Production of a newspaper that must get published by specific deadlines presents constant opportunities for solving real problems. This course places the burden for solving those problems on the students, particularly the editor or, in the editor's absence, the assistant editor.

H. Communicate effectively.

A school newspaper is an exercise in communication. It has the added advantage of being public communication for which the students must take responsibility. In many cases that requires a response to editorials that others take issue with, or a response to mistakes made in articles.

I. Set, meet, and evaluate goals.

Each issue of the paper presents a new set of goals that must be developed and met. The outcome of those goals is then evaluated by the class with a review of each issue of the paper.

J. Develop effective work habits and work skills.

The production of a paper requires extensive after-school work, sometimes amounting to 12 - 14 hours per week. These sessions require efficient and effective work habits by those involved, and a commitment that goes beyond that required of a standard academic class.

K. Make informed career choices.

Although it is impossible to know what experiences will result directly in a career choice by a student, the exposure to the variety of tasks involved with newspaper production provides excellent direct career exploration.

L. Apply safe work practices.

This course provides experience with some equipment (e.g., an offset press) that requires safe operation.

M. Working with groups toward a common goal.

The production of this paper requires a regular process of group decision-making with each issue. This process began on the first day of class with decisions made about format of the paper, banner design, and content. The content of each paper is a group decision, facilitated by the student editor, not by the instructors. A significant example of working toward a common goal came when the class elected to submit an issue of the paper to a New England school newspaper competition in March. The entire class is hoping to do well in this competition.

V. Course outline.

An outline for this course follows, with a day-by-day outline of semester one.

Curriculum - PUBLICATIONS WRITING

SCARBOROUGH HIGH SCHOOL 1987 - 1988

Mrs. Kinney, English
Mr. Abbott, Technology Education

I. PURPOSE

This course is designed to provide direct experience in the creative and technical aspects of writing, designing, laying out and producing publications. The class will be responsible for producing a regular school newspaper using computer-based desk-top publishing systems and an offset press.

II. STRUCTURE

The course will be team taught by a member of the English department and member of the Technology Education department, bringing experience in both writing and production together. The course will meet five times per week for 45 minutes per class.

III. GRADING

Students will be graded on a quarterly basis. The following weighting will be used to determine quarter grades:

A. Projects (articles, paste-ups, art work and other contributions to publication)	40%
B. Homework	20%
C. Tests	20%
D. Notebook records	10%
E. Participation	10%

IV. COURSE OBJECTIVES

All students will:

A. Design graphics and page layout.

B. Identify key stages in the historical development of journalism, graphic communications, and bookbinding.

C. Write, edit, and proofread articles and stories for publication.

D. Conduct and write interviews for publication.

E. Develop mechanicals through typesetting, hand lettering, page layout, conversion of artwork, paste-up, and revision.

F. Develop advertising sources and design suitable ad copy for publication.

G. Plan and produce photographs for publication.

H. Operate an offset press in the production of the school newspaper.

I. Identify and apply a variety of business techniques used to manage production and financing of publications.

V. COURSE CONTENT

All students will be required to complete activities designed to develop skills in research, journalism, writing for publication, editing, proofreading, interviewing, typesetting, lay-out, advertisement development, graphic design, printing processes, offset-press operation, color registration, photographic journalism, and business management.

A. History.

1. Graphic communications.

a. Development of spoken language.
b. Pictographs and ideagraphs.
c. Development of written language.
d. Development of type design.
e. Movable type.
f. Wood-block printing.
    1. Artwork.
    2. Publications.
g. Etching.
h. Letterpress.
i. Lithographic printing.
    1. Artwork and political posters.
    2. Publications.
j. Development of photographic processes.
k. Development of photojournalism.
l. Telecommunications.
m. Laser printing and typesetting.
n. Desk-top publication.

2. History of rhetoric.

a. Oral preservation of history.
    1. Song, poetry, and prose.
    2. Impact of Gutenberg press on poetry.
b. Development of written historical records.
c. Journalistic history.
    1. Sciences.
    2. Political impact of journalism.
    3. Personal diary keeping as history.
d. Development of written journalism.

B. Design process.

1. Thumbnail sketching.
2. Rough copy.
3. Comprehensive development.
4. Paste-up and layout.
    a. Use of technical instruments.
    b. Aesthetics of lay-out design.

C. Current printing processes.

1. Offset lithographic processes.
2. Modern photo-polymer relief printing.
3. Electrostatic laser copying.
4. Computer-generated artwork, graphics, and type fonts.

D. Writing for publication.

1. Research, organization, and writing of articles.
2. Word processing and typesetting in writing.
3. Content and key ideas in writing.
4. Simplification of prose styles.
5. Rewriting and editing.
6. Development of personal styles in journalism.

E. Editing and journalism.

1. Proofreading symbols.
2. Editing copy for length.
3. Copyright laws.
4. Libel, mistake, and credibility.

F. Management of publishing systems.

VI. PRIMARY REFERENCE TEXTS

A. Software documentation.

B. Technical graphics.

Walker, J.R. Graphic Arts Fundamentals. South Holland, Illinois: Goodheart-Wilcox Company, 1980.

Pocket Pal, a graphic arts production handbook. New York: International Paper Company, 1983.

C. Writing and editing.

Plotnik, A. The Elements of Editing. New York: Macmillan Publishing, 1982.

Strunk, W. & White, E.B. The Elements of Style. New York: Macmillan Publishing, 1973.

VII. SYLLABUS

A. Week one.

1. Monday - 9/8/87.

Labor day.

2. Tuesday - 9/9/87.

a. Introduction to course.

Pass out course outlines, review classroom expectations, review course plans with emphasis on production of paper and develop plan for first issue with students. Special back-to-school edition of paper is planned with new teacher interviews.

b. Class discussion.

Begin listing non-standard (more interesting) interview questions solicited from students. Discussion of individual style in writing.

c. Assignment.

Each student must write 10 interview questions for Wednesday.

3. Wednesday - 9/10/87.

a. Classroom presentation.

Mrs. Kinney - basics of journalistic interviews.

Mr. Abbott - review of student questions.

b. Class discussion.

Discussion of appropriateness of specific personal questions.

4. Thursday - 9/11/87.

a. Presentation to class.

Mrs. Kinney - wrap-up and review of interview techniques.

b. Class activities.

Each member of class to prepare for interview of another class member - 5 minutes.

Each member of class interviews an assigned student - 5 minutes for interview and 5 minutes after each session to summarize notes.

c. Assignment.

Each student write a newspaper article about the person interviewed and type or print it onto a spirit master for distribution to the class.

The spirit master must be passed in to Mrs. Kinney by 8:00.

5. Friday - 9/12/87.

a. Presentation to class.

Mr. Abbott - key issues to look for in reviewing the articles: opening; maintenance of suspense; accuracy; style; avoidance of repetition.

b. Class activities.

Copies of each article distributed to each student with time to read all. Students asked to identify appealing articles. Question: What specific things about this article make it good?

c. Assignment.

Each student read Sunday paper and list each separate section it contains on a spirit master. Pass in Monday by 8:00.

B. Week two.

1. Monday - 9/14/87.

a. Class presentation.

Return all articles with comments from both teachers. Distribute copies of lists to all.

b. Class activities.

Develop a content format for special issue and begin development of standard newspaper format.

Pass out sheets of legal sized and standard letter size blank paper to each student and have them develop several possible dummy papers with folds, staples, or folds and staples.

Class determination of lay-out format for special issue of paper. Column width and column-inches allowed for each article should be determined by reference to other papers. (Have students determine number of words in standard column-inch by counting characters.)

c. Assignments.

Develop a potential comprehensive list of sections needed in the standard newspaper.

Conduct and write two new-teacher interviews for first issue of paper.

Contact interviewee to set time for interview. Interview due Friday.

2. Tuesday - 9/15/87.

a. Class presentations.

Mr. Abbott - page layout possibilities for offset press. Banner, graphics and text placement in thumbnail form. Use of design process using thumbnails, roughs and comprehensive copies.

b. Class activities.

Class select one dummy as page format for paper.

Each member of class design a front page and an inside page by blocking in banner, graphics and text in four possible thumbnail forms. Each develop one rough. Produce a comprehensive from the rough for presentation to the class.

c. Assignment.

Finish comprehensive for class.

Prepare questions for teacher interview to be used first with student in class on Wednesday. This must be passed in Wednesday.

3. Wednesday - 9/16/87.

a. Class activities.

Present comprehensives to class with determination of final format by class.

Second practice interview with students - same format as first interview to be passed in for grade.

Prepare notes for article about 2nd interviewee.

b. Assignment.

Each student write article and type or print onto spirit master for distribution and grade.

4. Thursday - 9/17/87.

a. Class activities.

Class determination of articles for first edition of paper.

Release time to interview teachers during lunch period if necessary.

Distribute duplicated copies of each student interview to each student.

Prepare written draft of teacher interview.

b. Assignment.

Write a second draft of interview due on spirit master.

5. Friday - 9/18/87.

a. Class presentation.

Mrs. Kinney - elements of editing, including basic proofreading symbols.

b. Class activities.

Each student assigned an article to edit.

c. Assignments.

Assignment of additional articles as selected by the class. (Burger King policy, sports schedule, movie review and other articles besides teacher interviews.)

C. Week three.

1. Monday - 9/21/87.

a. Classroom presentation.

Computer lab - presentation and worksheet on use of AppleWorks.

b. Class activities.

Have students experiment with proportional spacing, line spacing, and margins to create an appropriate column-width printout.

Class selects the most suitable format for printing out paste-up copy of articles.

c. Assignment.

Pass in a sample printout that is spaced and laid out for reproduction in the school paper.

2. Tuesday - 9/22/87.

a. Classroom presentation.

Computer lab. Each student will be assigned a computer in the computer lab. Mr. Abbott will review the procedure for using AppleWorks.

b. Activities.

Students will type the two interview articles they wrote using the word-processor program in AppleWorks.

3. Wednesday - 9/23/87.

a. Activities.

Complete the process of typing articles and print out result in the format chosen by the class - 2-1/2" column width, boldfaced, proportional-2, 10 characters per inch, 6 lines per inch.

4. Thursday - 9/24/87.

a. Class presentation.

Mr. Abbott collects articles, clip-art, and art work, and demonstrates paste-up of pages 1 and 12.

b. Activities.

Students lay out remaining pages.

5. Friday - 9/25/87.

a. Class presentation.

Mr. Abbott demonstrates process of making plates for the offset press using the electrostatic plate maker (copier).

b. Activities.

Students finish layout of pages and make plates for printing.

D. Week four.

1. Monday - 9/28/87.

a. Class presentation.

Printing of pages using AB Dick 320 offset press.

b. Activities.

Students complete printing process and begin folding papers. Process completed after school.

2. Tuesday - 9/29/87.

a. Activities.

The newspaper is distributed before classes through homeroom teachers with an announcement that papers would be available and a request to fill out enclosed survey.

b. Classroom discussion.

1. What comments have you heard from students?

2. Class reactions to format, content, graphic layout, writing in first edition.

3. Wednesday - 9/30/87.

a. Classroom presentation.

Instructors lead a page-by-page discussion of the articles in first edition, with comments about common errors of grammar, style, form, layout.

b. Activities.

Discuss role of lead article in creating interest.

4. Thursday 10/1/87.

a. Classroom presentation.

Assigned jobs for 2nd edition to be made by instructors. Assignments are alphabetical and are made for the 2nd and 3rd edition. After that, jobs will rotate with each edition of the paper, with the assistant editor becoming editor, etc.

1. Editor in chief
2. Assistant editor
3. Proofreaders
4. Art/graphics/comics/cartoons

5. Layout
6. Production manager/press operator
7. Business manager
8. Sports Editor
9. Photography/video digitizer
10. School news
11. Entertainment editor
12. Feature editor

b. Activities.

Discuss the role of each job.

c. Assignment.

Write a description of each job. This description will be word processed in the computer lab.

5. Friday - 10/2/87.

Classroom.

Quiz - paper structure, typesetting, layout, interviewing.

Discuss the results of job lists.

Have editor begin to determine with the class the content of articles that will appear in the 2nd issue.

E. Week five.

1. Monday - 10/5/87.

Editor takes responsibility for class, leading discussion of content of next paper.

Editor assigns articles to be written by the class, and other responsibilities.

2. Tuesday - 10/6/87.

a. Activities.

Computer lab for remainder of week. Each student must type and print out their descriptions of individual jobs, and all of their articles by the end of the week.

3. Wednesday - 10/7/87.

Computer lab. Each student type their description of jobs due.

4. Thursday - 10/8/87.

Computer lab.

5. Friday - 10/8/87.

Computer lab. All articles due.

F. Week six.

1. Monday - holiday.

2. Tuesday - 10/13/87.

a. Class presentation.

Mrs. Kinney - editing articles.
Mr. Abbott - developing camera-ready copy.

b. Activities.

Students begin laying out paper.

c. Assignment.

After school one night this week to work on the paper.

3. Wednesday - 10/14/87.

a. Activities.

Complete layout of paper.

b. Assignment.

After school one night this week to work on paper.

4. Thursday - 10/15/87.

a. Activities.

Make offset plates and begin printing.

b. Assignment.

After school to complete printing.

5. Friday - 10/16/87.

a. Activities.

Folding and final preparation for distribution of papers.

b. Assignment.

After school if possible to complete preparation and delivery of papers to mailboxes of homeroom teachers for distribution Monday.

G. Week seven.

1. Monday - 10/19/87.

a. Classroom.

Review paper and comments of others.

Review individual jobs and responsibilities.

Brainstorm articles for follow-up in next paper.

Distribute form for getting advertising.

b. Assignment.

Proofread the paper carefully, making appropriate proofreading marks for corrections.

Each student must get one ad per quarter for the newspaper.

2. Tuesday - 10/20/87.

a. Classroom.

Collect homework (proofreading) and review.

b. Activities.

Editor leads discussion of content of next paper.

c. Assignment.

Walker, Graphic Arts Fundamentals- Layout.

3. Wednesday - 10/21/87.

   a. Classroom.

      Review of homework in preparation for layout test on Friday.

   b. Activities.

      Editor assigns articles and other responsibilities for next paper.

4. Thursday - 10/22/87.

   a. Classroom.

      Review of major principles of graphic design in layout - balance, white space, borders, alignment of copy, proportion, diagonals, changing copy size, continuing articles.

   b. Activities.

      Make dummy layout page for a newspaper.

5. Friday - 10/23/87.

   TEST.

      Major layout test. Students will be given two sheets containing paste-up copy of several articles, several headlines, several photographs and several pieces of clip art.

      They will have access to graphics knives, cutting surfaces, waxers, glue, technical pens, a copier capable of reducing and enlarging, T-squares, triangles, scales, pencils, tape, scissors, drafting tape, border tape and layout sheets.

      Each student will have 40 minutes to use these elements to lay out two pages in the same format as the school paper on an 8-1/2" x 14" layout sheet.

      Grading will be based upon alignment of copy, placement of text within margins, placement of graphics, use of borders and lines, and overall balance and appearance.

H. Week eight.

1. Monday 10/26/87.

a. Classroom.

Pass back tests and review elements of layout and results of the test.

b. Assignment.

Articles due tomorrow.

2. Tuesday - 10/27/87.

a. Classroom.

Quick review of computer use.

b. Activities.

Articles are due today. They are to be typed into the computer and printed out by the end of the day tomorrow.

3. Wednesday - 10/28/87.

Computer room.

4. Thursday - 10/29/87.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

5. Friday - 10/30/87.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

I. Week nine.

1. Monday - 11/2/87

a. Activities.

Students will make plates and begin printing paper.

b. Assignment.

After school to complete paper production.

2. Tuesday - 11/3/87.

a. Activities.

Finish printing and begin folding papers for distribution.

b. Assignment.

After school to complete paper production.

3. Wednesday - 11/4/87.

a. Activities.

Third issue of paper distributed through homerooms.

b. Classroom.

Discuss the third issue of paper. What are its strengths and improvements over the last issue? Are people reading it? Why are they reading it?

c. Assignment.

Walker, Graphic Arts Fundamentals. Chapter on printing photographs by half-toning.

4. Thursday - 11/5/87.

a. Classroom.

Jobs rotate after this issue to new editor. Everyone else moves up one job. Review feasibility of doing each job, considering changes that must be made.

b. Activities.

New editor leads discussion of content of next paper and assigns articles.

5. Friday - 11/6/87.

a. Classroom.

Presentation on half-toning using results of Polaroid half-tone screens.

Discuss continuous-tone photography.

Describe half-toned photography.

Take a photo of class using Polaroid 107 black-and-white film with a 105-lines-per-inch half-tone screen in front of the film pack. Enlarge this photo repeatedly, using the copier. When a student's head will completely fill an 8-1/2" x 11" sheet of paper, demonstrate the effect that distance viewing has.

(Half-tone screens available from Hartco Company).

b. Activities.

Editor completes assignments for fourth paper.

J. Week ten.

1. Monday - 11/9/87.

a. Classroom.

Computer lab. Pass out second AppleWorks sheet and review additional features available: Open Apple - O,H,N,D,Z,E,F,R,M,C.

b. Activities.

Use each of these commands to manipulate three existing files. If students have completed those listed, explore each of the commands available as printer options one by one. Pass in results at the end of period tomorrow.

2. Tuesday - 11/10/87.

   Activities.

   Lab time available to complete assignment from Monday.

3. Wednesday - 11/11/87.

   Holiday.

4. Thursday - 11/12/87.

   a. Activities.

   Review deadlines for remaining papers and alter as necessary to allow each student an opportunity to edit one issue.

   Review job assignments to determine if they are being done as assigned.

   b. Classroom.

   Begin presentation of printing methods and the operation of the offset press.

   c. Assignment.

   Articles due 11/16/87.

   Walker, Graphic Arts Fundamental., pages 33 - 42 and all questions.

5. Friday - 11/13/87.

   a. Classroom presentation.

   Complete presentation on various printing methods: relief, planographic, intaglio, stencil, electrostatic, laser printing, ink jet, dot matrix, photography, thermal.

   b. Activities.

   Students take notes on presentation.

K. Week eleven.

1. Monday - 11/16/87.

a. Classroom.

Quick review of computer use.

b. Activities.

Articles are due today. They are to be typed into the computer and printed out by the end of the day tomorrow.

2. Tuesday - 11/17/87.

Computer room.

3. Wednesday - 11/18/87.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

4. Thursday - 11/19/87.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

5. Friday - 11/20/87.

Workshop day.

L. Week twelve.

1. Monday - 11/23/87.

a. Activities.

Students will make plates and begin printing paper.

b. Assignment.

After school to complete paper production.

2. Tuesday - 11/24/87.

a. Activities.

Finish printing and begin folding papers for distribution.

b. Assignment.

After school to complete paper production.

3. Wednesday - 11/25/87.

a. Activities.

Fourth issue of paper distributed through homerooms.

b. Classroom.

Discuss the fourth issue of paper.

Assign new jobs with new editor for fifth issue of paper.

Continue notes on printing processes from 11/13/87.

c. Assignments.

All articles due on 12/8/87.

4. Thursday and Friday.

Thanksgiving vacation.

M. Week thirteen.

1. Monday - 11/30/87.

a. Classroom.

Complete notes on printing processes.

b. Assignment.

Walker, Graphic Arts Fundamentals. Pages 89 - 103, questions 1 - 19.

2. Tuesday - 12/1/87.

a. Classroom.

Review homework--offset printing. Presentation of the offset lithographic process.

b. Activities.

Demonstration of press operation with proper steps in sequence.

c. Assignment.

Review handouts on operation of the AB Dick 320 offset duplicating press in classroom.

3. Wednesday - 12/2/87.

a. Classroom.

Complete demonstration of press and steps required.

b. Activities.

Have several students make a plate and operate press to print something.

4. Thursday - 12/3/87.

a. Classroom.

Review of entire graphics unit in preparation for test on Friday.

b. Assignment.

Prepare for test tomorrow.

5. Friday - 12/4/87.

Test - printing processes and offset operation.

N. Week fourteen.

1. Monday - 12/7/87.

a. Classroom.

Review tests.

Assign editor for special Christmas issue to be published December 21, 1987. Preparation for this issue will overlap with preparation for issue number five.

b. Activities.

Editor for issue five checks progress on articles.

c. Assignments.

All articles due tomorrow at beginning of period. Period to be spent in computer room.

2. Tuesday - 12/8/87.

a. Classroom.

Quick review of computer use.

b. Activities.

Articles are due today. They are to be typed into the computer and printed out by the end of the day tomorrow.

3. Wednesday - 12/9/87.

Computer room.

4. Thursday - 12/10/87.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

5. Friday - 12/11/87.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

O. Week fifteen.

1. Monday - 12/14/87

a. Activities.

Students will make plates and begin printing paper.

b. Assignment.

After school to complete paper production.

Articles for Christmas issue are due in paste-up copy form on 12/16/87.

2. Tuesday - 12/15/87.

a. Activities.

Finish printing and begin folding papers for distribution.

b. Assignment.

After school to complete paper production.

3. Wednesday - 12/16/87.

a. Activities.

Fifth issue of paper distributed through homerooms.

b. Classroom.

Discuss the fifth issue of paper. What are its strengths and improvements? Editor of Christmas issue begins layout of issue number six.

4. Thursday - 12/17/87.

a. Activities.

Students finish laying out Christmas issue.

b. Assignment.

After school to complete the Christmas issue.

5. Friday - 12/18/87.

a. Activities.

Students will make plates and print Christmas issue.

b. Assignment.

After school to work on paper.

O. Week Sixteen.

1. Monday - 12/21/87.

a. Activities.

Finishing operations on paper.

b. Assignments.

After school to work on paper.

2. Tuesday - 12/22/87.

a. Activities.

Distribute Christmas issue through homerooms.

b. Classroom.

Discuss issue, responses, improvements, etc. Assign new jobs to people for issue seven.

c. Assignments.

Articles for issue seven of paper are due January 11, 1988.

3. December 23,1987 through January 1, 1988.

School vacation.

P. Week seventeen.

1. Monday - 1/4/88.

a. Classroom.

Mrs. Kinney reviews articles assigned for issue seven with observation about specific improvements in writing since beginning of class.

Discuss need for newspaper style sheet.

b. Activities.

Editor to review job board with class, and lead discussion on articles.

c. Assignment.

List the most common errors and inconsistencies found in the last six issues.

2. Tuesday - 1/5/88.

a. Classroom.

Discuss lists of common errors and inconsistencies developed by students. Distribute the first five notes sheets used to develop style sheets with the class.

b. Activities.

Use overhead to discuss each rule on style sheets, with class giving an example of each.

c. Assignment.

Read style sheet rules completed today and preview sheets next section.

3. Wednesday - 1/6/88.

a. Classroom.

Quick review of first few pages of style sheet.

b. Activities.

Continue with style sheets with student decisions about specific rules.

4. Thursday - 1/7/88.

Continue style sheets from Wednesday.

5. Friday - 1/8/88/.

a. Classroom.

Finish style sheets.

b. Assignment.

Each student select one article of 200 words or more, written by the student, and edit it using the style sheets they have developed.

Q. Week eighteen.

1. Monday - 1/11/88.

a. Classroom.

Quick review of computer use.

b. Activities.

Articles are due today. They are to be typed into the computer and printed out by the end of the day tomorrow.

2. Tuesday - 1/12/88.

Computer room.

3. Wednesday - 1/13/88.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

4. Thursday - 1/14/88.

a. Activities.

Layout of paper for next issue.

b. Assignment.

Each student must put in at least one session after school on layout and printing of paper.

5. Friday - 1/15/88.

a. Activities.

Students will make plates and begin printing paper.

b. Assignment.

After school to complete paper production.

R. Week nineteen.

1. Monday - 1/18/88.

Martin Luther King day - no school.

2. Tuesday - 1/19/88.

a. Activities.

Finish printing and begin folding papers for distribution.

b. Assignment.

After school to complete paper production.

3. Wednesday - 1/20/88.

a. Activities.

Seventh issue of paper distributed through homerooms.

b. Classroom.

Discuss the seventh issue of paper.

Assign new jobs with new editor for eighth issue of paper.

Editor leads discussion of content of next issue.

4. Thursday - 1/21/88.

a. Classroom.

Mrs. Kinney discussed the pyramid technique for writing news articles. Three articles were used to identify use of the five W's and their placement within the articles.

b. Activities.

Underline occurrences of five W's of news reporting within each article provided.

c. Assignment.

Finish reading all articles in handout.

5. Friday - 1/22/88.

a. Classroom.

Mrs. Kinney arranged for a disruption to occur during the class period, staged with the help of a school custodian. Students were unaware that the incident was staged at the time it occurred.

b. Activities.

Students were asked to report on the incident by writing a proper news article.

S. Week twenty.

1. Monday - 1/25/88.

a. Classroom.

Student discussion of editorial writing and reviewed responsibilities of editorial writing.

Student discussion of censorship of editorials and application to school newspaper. Review of goals of our paper and how they determine content.

b. Activities.

Read editorials from handout.

c. Assignment.

Write one editorial to be submitted for grade and consideration for next paper.

2. Tuesday - 1/26/88.

Exam review.

3. Friday.

Final exam - 1 1/2 hours.

This exam consists of two parts. Part one occurs in the computer lab and involves proofreading and correcting two articles which have been give to students as files on an AppleWorks disc. These articles contain errors in fact, grammar, style, punctuation and paragraph order.

Part two occurs in the graphics lab and involves laying out page 1 and page 12 of a school newspaper using proper printouts of the articles proofed, and some headline and clip-art graphics supplied by the instructor. The students must make a specific per cent reduction on the copier, paste up camera-ready copy, and make an offset plate of the result on the copier (electrostatic platemaker).

PUBLICATIONS WRITING - MIDTERM EXAM

NAME _____ DATE _____

Welcome to the wonderful world of micro-computer exam taking. This exam requires you to use two files that are contained on your data disc. The names of each of these files are: "printing article"; and "style article."

Your mid-term consists of several activites that are required for producing a newspaper. You must proofread each article, make corrections, print copies, paste them up with some graphic material, and make a plate for the offset press.

Grading:

Proofreading.....60%

- Factual errors.....20%
- Spelling and punctuation.....10%
- Stylistic errors.....10%
- Correct use of inverted pyramid.....10%
- Grammatical errors.....10%

Layout.....40%

- Alignment of copy and image on plate.....10%
- Design of layout.....10%
- Proper sizing and placement within margins....10%
- Proper print-out.....10%

A. MATERIALS YOU MAY USE.

1. Your style sheets.
2. A dictionary.
3. Anything located in the computer lab can be used as a resource EXCEPT Mrs. Haigis or Mr. Tewhey.
4. A calculator.
5. A computer.
6. A printer.
7. Layout tools and drafting instruments.
8. The electrostatic platemaker and simulated process camera (ESPM). (OK, its a copier.)

9. Black pens.

10. Border tape.

11. Waxer.

YOU MAY NOT USE YOUR NOTES, OTHER THAN THE SYTLE SHEETS.

B. INSTRUCTIONS.

1. Load each of the files from the disc onto the desktop.

2. Work with the file named "style article."

3. Begin by typing your name and today's date at the beginning of the file.

4. CHANGING ARTICLES.

The articles contain a number of factual errors, misspellings, grammatical errors, stylistic errors, punctuation errors, and errors in organizing the paragraphs.

a. Rename each file by replacing the word "article" with your last name. ("printing article" would become "printing Abbott")

b. Correct all errors as though the articles were to be used in the school paper.

c. Save the files to disc as you are working on them in case we lose power.

5. PRINTING.

a. Set the printer options that result in: the proper column width for the paper; proportional-2 spacing; 6 lines per inch; and boldfaced print.

b. Print out TWO copies of each article, using the highest print quality. Give one to Mrs. Kinney, and keep one to use for laying out a page.

6. CLIP ART.

   a. A sheet containing several graphics is attached to this test. Select one or more of these graphics and calculate the percentage enlargement or reduction necessary to change them from their current size to 2 1/4 inches.

   b. Print a copy on the ESPM. You have one opportunity to make this change, so it cannot be done by trial and error.

7. PASTE-UP.

   a. Make a full-size copy of your revised articles.

   b. Design a single-page layout, using your graphic and your articles. Begin both of them on the same page as though they were lead stories.

   c. Using the waxer, paste up the page. You may make a copy of the final page before making the plate if you wish.

8. PLATE MAKING.

   a. Use a piece of 8 1/2 x 11 paper as a substitute offset plate.

   b. Print your page layout onto this sheet in the same manner that you would to make a plate on the plate maker.

9. Give you final plate to Mr. Abbott and relax.

REDSKIN REVIEW STYLE SHEET

NAMES AND TITLES

1. Use Mr., Mrs., Miss, Ms., or the proper title with names of teachers and other adults:

2. The first time a name appears in a story, use the full name plus a title for adults. Never use a single initial. Be sure names are spelled correctly:

3. The first time the name of someone with a special title appears in a story, use the title. Such titles usually follow the name but may precede it. They are not capitalized unless they replace Mr., Mrs., Miss, or Ms.:

4. After the first time a name appears, use Mr., Mrs., Miss, Ms. with the last name for adults; use only the first name for students, except in sports stories, where only the last name is preferred:

5. Use "the" with Rev. and include Mr. when the first name does not appear: the Rev. Howard Stone, the Rev. Mr. Stone.

CAPITALIZATION

CAPITALIZE

1. All proper nouns, months, days of the week, holidays:

2. Names of sections of the country but not directions:

3. One-word titles when they precede names of adults:

4. Full names of schools, clubs, organizations, streets, geographical areas, or companies:

5. Proper names for races and nationalities:

6. Names of athletic teams:

7. Principal words in titles of books, plays, movies, or songs, including A, An, or The when it appears first in a title:

DO NOT CAPITALIZE

1. School subjects, except languages or specific course titles:

2. Personal titles used without names:

3. STREET, COMPANY, CLUB, or similar words, unless they are a part of a specific name:

4. Abbreviations for the time of day:

5. Seasons of the year:

6. Academic departments, except for words derived from proper nouns:

7. Names of classes:

8. Boards and committees, unless given a distinctive name:

9. School rooms and buildings, except for those with special names:

10. The subject of a debate or resolution, except the first word:

ABBREVIATIONS

1. Abbreviate Jr. or Sr.following a name. Comma?

2. Abbreviate long names of organizations or other familiar names when there can be no confusion. Use no spaces or periods between letters:

3. Abbreviate the word SAINT in place names:

4. Do not abbreviate names of states, months, days of the week,or the words STREET, AVENUE, CHRISTMAS, RAILROAD, COMPANY, FORT, or POINT in place names:

5. Do not use symbols or abbreviations for distances, weights, or the words PERCENT and DEGREES:

DATES AND TIMES

1. Dates are written one way only:

never:

2. Never use the year for a date within the current year, nor the preceding year or coming year unless there would be confusion:

3. Whenever possible, use terms instead of the date:

4. Do not use the word ON before days or dates:

5. Do not use the word O'CLOCK in showing time. Omit the zeros for even hours:

FIGURES

1. Always use figures for ages, dimensions, money, percents, days of the month, degrees, hours of the day, scores, room numbers, page or chapter numbers, and street numbers:

2. Except for those numbers in the preceding rule, spell out numbers up to and including nine and use figures for numbers 10 and over.

3. Use the abbreviations st, nd, rd, and th after numbered streets above Ninth but never with dates:

4. For money under $1, use figures and the word cents; for $1 or over, use the dollar sign. Do not use zeros when they are not needed.

5. Do not begin a sentence with a figure. Spell it out or rewrite the sentence.

6. In a list containing numbers below and above 10, use figures for all.

PUNCTUATION

COMMAS

1. Use to separate all words in a series:

2. Use to set off parenthetical expressions or nonessential clauses:

3. Use to set off appositives, nouns of address, or identifications:

4. Use to separate a quotation from the rest of the sentence:

5. Use in addresses:

6. Use in numbers over 999, except for street numbers, telephone numbers, or item numbers:

7. Use in sports scores:

8. Use before AND, BUT, OR connecting clauses in a compound sentence.

9. Use after an introductory clause:

10. Do not use in place of a period to separate complete sentences.

SEMICOLONS

1. Use to separate independent clauses not connected by a conjunction:

2. Use between main divisions of a listing:

3. Use to divide enumerations when commas would not be clear:

COLONS

1. Use to introduce a series after THE FOLLOWING or a similar term but not after verbs such as ARE or INCLUDE:

2. Use to introduce an example:

3. Use after characters' names in a dramatic sketch or joke:

4. Use in giving the time of day, but not in even hours:

5. Use along with a period to separate minutes and seconds in sports times:

APOSTROPHES

1. Use to form a possessive:
To form the possessive of a singular word, add an apostrophe and S:

To form the possessive of a plural word not ending in S, add an apostrophe and s:

To form the possessive of a plural word ending in S, add an apostrophe only:

2. Use in contractions or to show omitted letters or figures:

3. Use in plurals of letters and figures:

4. Do not use in possessive pronouns:

5. Do not use in such abbreviations as PHONE, CELLO, and PLANE.

QUOTATION MARKS

1. Use to show the exact words of a speaker. When not quoting exactly, use an indirect quotation without quotation marks:

2. If a quotation includes several paragraphs, use quotation marks at the beginning of each paragraph and at the end of the last one.

3. For a quotation within a quotation, use single quotation marks.

4. Periods and commas are always placed within quotation marks, question marks and exclamation points only if they are part of the quotation:

5. Start a new paragraph each time there is a change of speaker.

HYPHENS

1. No general rule can be stated for the use of hyphens in compound words. You must learn the individual words or look them up. If you cn write a compound word as a single word (cheerleader) or as two separate words (police chief), do not use a hyphen.

2. Use in certain common compound titles:

3. Do not use in such words as weekend, bylaws, copyreader, makeup, textbook, cheerleader, homecoming, lineup, or basketball.

4. Use with compound adjectives but not with the same words used as nouns:

5. Use in sports scores:

6. Use, between syllables only, to divide words at the end of a line.

DASHES

1. Use after an introductory date in school calendars:

2. Do not use to replace periods.

TITLES

1. Enclose in quotation marks the titles of plays, poems, chapters, movies, songs, or radio and TV programs:

2. Underline book titles.

3. Capitalize newspaper and magazine names but do not underline or place them in quotation marks.

SPELLING AND USAGE

1. Webster's New World Dictionary is a good standard source for spelling and division of words. When two spellings are given, the first is preferred.

2. Use the shorter spelling for program, quartet, and catalog, but do not use simplified forms such as thru or nite.

3. Use the er for for theater.

4. Do not add s to forward, backward, or toward.

5. Learn to spell the following spelling "demons":

accommodate	led
airplane	library
all right	pantomime
badminton	principal (head of a school)
coming	rehearsal
counselor	sophomore
develop	sponsor
eligible	until
embarrassment	writing
intramural	

6. Distinguish between homonyms: their, there, they're; its, it's; who's, whose; your, you're; then, than.

7. Use alumnus for masculine singular; use alumni for masculine plural and for a group of both sexes; use alumna for feminine singular; use alumnae for feminine plural.

This is issue 8 of the Redskin Review, published by the publications writing class. It has been reduced from 8 1/2 x 14 to 8 1/2 x 11 to allow it to be reproduced. The paper is printed both sides and folded once.

The Voice of Scarborough High School!
REDSKIN REVIEW
Volume 8, Edition 8, February 12, 1988

Vehicles of SHS
by Bill Sproull

It sits quietly in the back parking lot of SHS some days, waiting. It waits for Steve Hochsuth to turn the key and bring its 5.0 liter, 305 cubic inch V-8 to life. "It", as some may have guessed, is the red 1986 Trans Am GTA that Steve drives to school on some occasions. It's an automatic, and although Steve would prefer it to be a standard, he's not complaining. It has a T-top so Steve can drive standing up, and Steve sums up its performance very simply, saying, "It's fast." In fact, he's only lost one drag race, to a Honda Prelude, due to the fact that there were police cars ahead of him, causing him to slow down.

Pontiac

Dear Editor,

I don't understand why everyone made such a fuss over the new midterm exam schedule. I think it worked out fine.

I'm a senior at Scarborough High School and I was used to the previous schedule. But I was also pleased with the new schedule of having no more than two exams a day. It gave students more time to study and we weren't as rushed.

However, I didn't like the fact that midterms were carried over the weekend. It would have been much better to have the last day of exams on a Friday so that students and teachers alike could both relax and get caught up on old work over the weekend. It was hard to study over the weekend. Especially taking into account that it was a "Superbowl" weekend (good thing the Patriots weren't playing).

It would be interesting to see, on the whole, how the overall grades for Monday exams compare with the overall grades from exams taken before the weekend.

Jen Winch

Only 130 days til graduation!!

Scarborough Academic Decathlon Wins State Championship
by Marc Minkler

Missing: C. Temm, P. Hinckley, T. Khan

Nerves were strung high. Tension filled the air. Competitors wrung their hands nervously as onlookers watched. After a major computer breakdown and an extremely difficult Super Quiz, no scores had been posted. All the testing was finished, but who had won? Finally some team scores were posted, and the teams were ushered into the awards ceremony.

After the introductions had been given, the awards were presented. This lasted for well over an hour and a half. In the end, Scarborough was victorious. Beating the second place team by over 4,200 points, some might even say the win was easy. But in no way was the win easy. The team had placed huge amounts of time, effort, and strength to achieve this. Hundreds of hours of work went into this, as well as hundreds of dollars spent on junk food (their "special diets").

Here is the person and number of medals recieved:

Glenn Berry	7
Pete Hinckley	3
Adam Laux	7
Tom Horton	3
Chip Temm	4
Tariq Khan	3

Glenn Berry was the high scorer and recieved a five hundred dollar scholarship, and Robb Friedman was the second high scoring alternate.

Overall, the team did exceptionally well, and the competition in San Antonio, Texas will be a much earned vacation. Congratulations to them all.

BEST COPY AVAILABLE

Redskin Review Staff

Editor-in-Chief.....Mike McKeen
Assistant Editor....Marc Minkler
Proofreaders.....Jen Rice
Sue Stevens
Erika Swift
Arts/Graphics.....Julie Lynch
Production Managers.....Jen Winch
David Desmond
Business Manager....Robb Friedman
Sports Editor.....James Grover
School News.....Peter Hinckley
Features.....Bill Sproull
Cartoonist.....John Lane

Dear Editor,

Are mid-term exams really necessary?

The mid-term exams break up the momentum and consistency of classroom learning. The actual test dates use up only four school days, but realistically, two to three weeks of student and faculty time is hindered. Teachers are forced to cram material as time grows short, so that they may meet their goals for the semester. Planning the tests requires a great deal of faculty time, and individual teachers often find themselves falling behind in grading papers, keeping up on the progress of students, and creating assignments for classes. Scarborough's faculty is split on the issue of using class time to review for the exams, which account for a disagreeable twenty percent of the student's semester grade. Some point out that student's attention wanes when old material resurfaces, while others say it is unfair to deny a refresher.

Looking at the tests from the student's point of view, mid-terms eliminate two weeks of learning time. They place unnecessary stress on the students by forcing them to keep up with the regular classes as the quarter comes to a close while they are going back to review. Mid-term exams temporarily hinder whatever extra-curricular activities the student may be involved in. In the case of seniors, college application deadlines coincide with mid-terms to form an unparalleled roller coaster ride of two week tension. Is it fair to administer these tests to seniors during this period? Furthermore, some of the pupil's enthusiasm is depleted, partly by a feeling of helplessness. The tests give a taste of conclusion to the student, and he or she may become slightly apathetic when regular classes resume.

Granted, a test is needed to "sum up" what a student has learned, but this task can be taken care of by the finals in June. The end of the school year is a much more natural time to recount the accomplishments of

continued on pg.4

-132-

THE TUB SHOP
30 Market Street • Portland's Old Port • 774-7491
RELAX AT THE PRIVATE HOT TUB ROOM RENTALS
• SHOWERS, DRESSING AREAS AND STEREO IN EACH ROOM •
• TOWELS AND HAIRDRYERS FURNISHED •
• JUICE AND DISPOSABLE BATHING SUITS AVAILABLE •
LOWER DAY RATES AVAILABLE
2 PEOPLE 1 HOUR ONLY $12.00*
UVA TANNING 10 VISITS $35.00

overheard...

"There was this old lady dying next to me...and this girl with a Dorito caught in her mouth goin''hccch hccch'....It was awful!'

"Ya know, if this game was a fight, they would have stopped it by now..."

"This is Bobby Joe Crumbat of Forsyth, Georgia....."

"If you go up in space, can you see the latitude and longitude lines on the Earth?"

"Let's make Stonehenge!!!!!"

"Excuse me, customers, could you please go back upstairs? We're doing things down here people who don't work here should not know about."

"Vamanos, chicos, vamanos, vamanos, vamanos..."

"Mr. Williams, it seems to me you've been a black quarterback all your life(?)."

"Oh, my, can we help you little girl...?"

"It is an understood policy, in which students are not aware of, unless they ask."

"Squeeze!!!!!!!!!"

"WHAT ABOUT URANUS?....I've never heard of a wobble in Uranus."

"We have low friction pucks here on Planet X, too...."

"Just kidding.....?..."

"Are you ripping my newspaper?!..Weeeeeell..."

"Folks, I can't tell you how important it is to wear your boxing gloves to bed.." - Joe Carcione - The Gangrene Grocer

"Gerald, admit it, you'll go to USM because that's the only place your father will drive you every day..."

Dear Natural Helpers,

I have a problem that I hope you can help me with. I was going out with this guy last year, Jack. Jack broke up with me to start dating someone else. I was depressed for a long time after Jack broke up with me. Now I am seeing someone new and things are going quite well. The problem is Jack has started to call me up again. He says he knows he hurt me, and he promises he'll never do it again. I just don't know what to do. Jack won't leave me alone, and I'm not sure I want him to. Can you help me?

Jack and Jill?

Dear Jack and Jill?,

It sounds like you are happier with your new boyfriend. The fact that you are no longer unhappy without Jack probably made him realize what he lost when he broke up with you. He now wants to take back his actions but I think that you know it is a little too late for that. As far as your feelings are concerned, now that Jack is giving you the attention that you wanted when you broke up, you are dismissing your new feelings for the new guy. At least for the sake of your new boyfriend give the new relationship a try before you go back to Jack. If you do decide to take Jack back, take your time before it gets too serious and you end up hurt again.

Natural Helpers

T.V. Trivia Answers

1. Grant Avenue Grammar School
2. Alka Seltzer
3. Alfred
4. seven
5. Flipper
6. Joanie
7. The Daily Planet
8. Rice-a-Roni
9. Rodney Dangerfield
10. Doodyville

"Flight of the Intruder"
(continued from page 4)

around an A-6 Intruder pilot, Jake Grafton, on board the U.S. aircraft carrier Shiloh. Dissatisfied with the war and distraught over the death of his friend and navigator, Jake embarks on a perilous mission over North Vietnam which climaxes in the skies above Hanoi.

Flight of the Intruder is a great achievement by first-time author Stephen Coonts. The descriptions of missions over unfriendly territory and night aircraft carrier landings are so exciting and realistic that it seems that you are Jake Grafton. The character developement of Jake Grafton is also superb, along with great insight into life on board a United States aircraft carrier. Overall, Flight of the Intruder is a book exciting enough to enjoy and authentic enough to learn something about Navy fliers that "Top Gun" didn't show.

Editorially Speaking

Dear Readers,

I have been carefully tracking the case in which a certain member of the basketball team asked if he could compete in the state meet and also play on the basketball team. From what I understand, he checked with both coaches and reviewed the written rules and regulations of the state and the school. To my knowledge, there is no written rule or policy which would prevent an athlete from performing such an event. When the athlete approached the administration with his request, the administration reviewed the situation and after a period of a few weeks decided not to let this event take place.

I was recently reading the Boston Globe and I came across an article very similar to this situation. An athlete from Apponequet Regional High School in Massachusetts wished to compete in basketball and run in the track meets. He approached both the basketball coach and the AD with the idea. The coach and the AD agreed to let the athlete compete if it was within the state rules. The rule in Mass. is that an athlete cannot compete in two contact sports in one season. It was also agreed that since basketball practice requires an adequate amount of running drills, that the athlete would only have to practice with the basketball team and could compete in the track meets.

The end result in this case was that the basketball team did not lose anything and the track team gained a record breaking runner.

The Editor

There should be an open campus policy at this school. It's that simple. Other schools have open campus policies, such as Portland High School, and there is no reason why a respectable school like SHS shouldn't be able to. An open campus policy would enable students to leave school whenever they do not have a class.

The open campus policy could be worked much like the open study program, which has run successfully as far as I can tell. People with first and last period studyhalls would especially benefit, and to make it even less of a problem, it could be restricted to seniors only. With proper planning, open campus could work as well as open study has.

Hopefully anyone sharing my viewpoint will express themselves by writing an editorial or a letter to the editor.

Bill Sproull

BEST COPY AVAILABLE

SPORTS

Girls' Indoor Track
by Erika Swift

On Saturday, February 6, the Southern Maine Girls' Indoor Track Conference championships were held at the Portland Exposition Building.

Scarborough girls placed fifth overall with Toni Carr leading the team by placing second in the high jump and fourth in the Senior 300. Julie Johnson finished with an impressive second place in the 2 mile run followed by Kathy Ferrera at third. Debbie Driskо came in fourth in the Junior Shot Put while Teresa Driskо also came in fourth in the Senior Shot Put. Karen Nagle finished fifth in the Senior 300, Heather Hauser came in fifth in the high jump, and Lisa Paradis finished sixth in the Senior 1000. Patty Dobr iko finished fourth in the 1 mile run, and newcomer Amy Sproull placed in third in the Junior Hurdles and fifth in the Junior 300. The Scarborough Junior Relay team finished fifth and the Senior Relay team placed sixth.

The Maine States will be held on February 15 at Orono. There will be a fan bus going up, so we hope to have a lot of people there to cheer Scarborough on.

Coming Attractions
by Erika Swift

Close-Up is having a fund raiser to raise money for their trip to Washington D.C. this coming May.

The club will be selling buttons after February vacation. The buttons are the student's choice, all you have to do is make up the design or saying that you would like to be on your button and turn it into Mrs. Bradford in Room 31.

So, watch for posters with more information and be thinking of what you would like to have put on your personalized buttons.

continued from pg.2

individual students. Placing these exams in the month of February results in a transition period, but the results are negative. Consistency is disrupted, and so is the frame of mind of the student to start the "second" semester. Place the exams in June, when the collective attention of the student body is waning anyway, rather than at a time when they can learn more. This time in the middle of the school year is much more wisely spent in new study than with a two week period of stagnation. Eliminating mid-term exams can increase the efficiency of Scarborough High School.

David Desmond

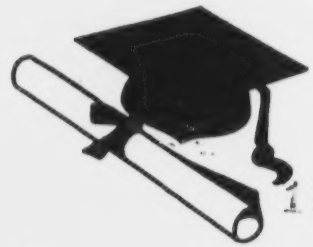
SENIOR SPOTLIGHT

BRENT PEARSON
BY JEN RICE

On November 11, 1969 in Holyoke, Massechusetts a bouncing baby boy named Brent was born. Brent is a Natural Helper and it really shows through, especially when asked about his favorite things. He replies "friends", and sports such as soccer, hockey, and running. Some of Brent's dislikes are uniquely enough, raisins and apples. When asked what he would most like to change about Scarborough High School he replies "NO FINALS FOR SENIORS!", and more space for students in the form of an expansion of the school. Employed at Fredrick Brothers, Brent enjoys older music from times such as the late 60's, and the color grey because it is a neutral color that gives nothing away.

Brent is also doing something very special. He is a member of the Marine Corps. This gives Brent the dicipline and self motivation that he is looking for in life. As a member of the Corps, he works one weekend per month until he leaves for boot camp, in June, for 11 weeks. His interest in this also comes from the opportunities offered, the travel involved(places such as Norway or Japan), and the chance for advancement.

Brent wishes all his graduating friends much good luck in the future, and I'm sure they wish the same for him.



153

Maine Athletes to Compete In Calgary Olympics

by Dave Desmond

This week, the Olympic torch will travel from its home in Athens, Greece for a three week stay in Calgary, Alberta, Canada. The venues for the XV Winter Games are spread out in a 60 mile radius around Calgary. Skiing events will be held at Mount Allan. Hockey, figure skating, and ice dancing will be hosted in the Olympic Saddledome. Calgary should be exciting for the spectator. According to Mr. Ralph Klien, mayor of Calgary, the theme for the fan is "Eat, drink, and be merry". Local TV coverage will be on ABC's Channel 8.

The United States joins 40 other countries by sending a team to Canada. Our strength lies in men's and women's figure skating, speed skating, and alpine skiing. Recently, the nordic skiiers and biathletes have improved their status. Ski jumping is ruled by the Scandinavians, while the bobsled and luge competitions are wide open.

Maine will send five athletes to Calgary. Leslie Kricho of Paris and Dan Simoneau of Livermore Falls are cross-country skiiers. LeeLee Morrison of Naples will compete in freestyle skiing for Canada. Freestyle skiing is an exhibition sport this year, and America has no team. Jon Owen of Bethel is set to compete in singles luge. Eric Weinrich of Gardiner, via North Yarmouth Academy and the number one ranked UNO hockey team, will be a Team USA defenseman.

IRON HOUSE
GYM
883-3838
BODYBUILDING & HEALTH CENTER

FREE WEIGHTS
UNIVERSAL STATIONS
BICYCLES
ROWING MACHINES
MEN & WOMEN'S LOCKER ROOMS
TANNING BEDS
SPECIAL STUDENT RATES
WIDE ASSORT. OF SUPPLEMENTS

Gift Certificates

12

Reader's Poll Results

by Sue Stevens

The Reader's Poll of 1987 didn't have a big response, to it, but of the 41 students that did take the time to fill out their surveys, the favorites of each category are as follows:

Favorite Movie:
1. Fatal Attraction
1. The Lost Boys
2. Rocky Horror Picture Show
3. Dirty Dancing

Favorite Actress:
1. Molly Ringwald
2. Karl Green
3. Cher

Favorite Actor:
1. Charlie Sheen
2. Patrick Swayze
3. Michael Douglas

Most Enjoyed Song:
1. Could Have Been /Tiffany
2. Is This Love /Whitesnake
3. I Need Love /L L Cool J

Best Group/Singer:
1. Def Leppard
2. Whitesnake
2. Bon Jovi
3. U2

Favorite Food:
1. Pizza
2. Seafood
3. Chocolate

Student Council Busy and Active

by Robb Friedman

The Student Council had been very busy lately. In January, the Council ratified a new constitution, which entails rules about attendance, elections, and duties of the Council. A copy of this very interesting constitution is posted upon the new Student Council Bulletin Board, next to the office. Also on the bulletin board is the bi-weekly agenda of the Council, posted a day before the meeting, and a beautiful Scarborough High School calender, designed by Secretary Holly Cyr. If any club or organization would like to put their events upon the calender, contact Holly or any other Student Council represtative.

Events in the future of the Council include the planning of Mad March, which is sure to be a fun-filled, action-packed month of thrilling excitement, and the Red Cross Blood Drive. The Council is open to any suggestions about what you would like to see done for the school. Just forward any suggestion to your Student Council representatives. All students and teachers are also welcome to attend any Student Council meetings, held in Room 30 every two or three weeks.

3

Movie Review: Return of the Living Dead, Part Two
by Pete Hinckley

"Return of the Living Dead Part Two" is a movie, for all practical purposes, which has no redeemable values whatsoever. But what it lacks in maturity it excels in entertainment. This movie is one of the best "trash" films of 1987; and surprisingly enough, one of the funniest.

Set in the modern day United States, "Return of the Living Dead Part Two" centers around a small sealed container found by three boys. Two of the boys play with the cannister, releasing its nauseous fumes into a nearby graveyard. This gas then re-animates the dead, and makes them lust for "live brains". Like all zombie movies, this film thrives on blood and gore for its primary source of entertainment. But unlike other horror films of this genre, "Return of the Living Dead Part Two" also mixes in a unique blend of witty humor to make this movie especially entertaining.

If you want to see a classy film with a meaningful message, then skip this movie. But if you want to see an excellent action-horror-comedy film, then "Return of the Living Dead Part Two" is the movie to see.

Movie Review: Good Morning Vietnam
by Julie Lynch

"Good Morning Vietnam is definitely worth seeing. On the night of it's release, the 9:25 show was sold out by 8:15. The crowd in the lobby resembled a herd of cows.

Robin Williams stars as a disc jockey on an American radio station in Vietnam. The soldiers love him but, his superior officers hate him. He breaks the format of the station by playing rock'n'roll. His officers use this and any other flaw in his character to try and relieve him of his duties.

If you see only one movie all year, I'm sure you won't be disappointed with this choice. The outrageous "Good Morning Vietnam" will ring in your ears long after you leave the theater. "Good Morning Vietnam" is a sure hit.

Book Review: Flight of the Intruder
by Pete Hinckley

Flight of the Intruder

Once in a while, a person writes a novel that is so authentic, so realistic, that reading it is like travelling through time and space and becoming part of the story itself. Flight of the Intruder, by Stephen Coots, is one of these books.

Set during the Vietnam War, Flight of the Intruder centers

Boys' Indoor Track
by Erika Swift

The Scarborough boys' track team tied for seventh place overall in the Southwestern finals held Saturday, February 6. The boys did really well considering they were up against some very competitive schools.

Bill Sproull finished second, losing by an inch, in the Senior 300 with the time of 35.6. Dan Kellener almost beat Mike Lyons in the Senior 1000, but walked away with a well-deserved second place.

Mike Henry came in second in the Intemediate 600, and fourth in the Intermediate 40. Ryan Werner placed second in the Intermediate hurdles and Aaron Werner tied for sixth in the Senior Hurdles.

The Senior Relay team consisting of: Adam Laux, Charlie Macomber, Dave Hobbs, and Bill Sproull, finished with an impressive second place.

The boys will be competing again in the States at Orono on Monday, February 15.

Cheering Competition
by Sue Stevens

The Scarborough High School varsity cheerleaders spent January 30th, at Lewiston High School with crossed fingers as they waited to see if their name was going to be called to come back, and perform again for one of the four spots to go to the state competition. Unfortunately, the squad was one spot away from making the call back!

The varsity cheerleaders would like to thank the junior varsity cheerleaders and the spectators who came to the competition. They gave the squad lots of support and cheered them on until the end. As a cheerleader, I would like to say that for all the support we have given the SHS teams, we were upset to see that more students couldn't have taken three hours out of their non-school time to support us!

Scarborough Hockey
by Andy Curry

This year, Scarborough High students are once again fielding a hockey team after a long absence of the sport here. Already the future for the team looks very promising.

Presently their record is 7-1, having played Deering and Mt. Ararat. Soon, they will be facing off against Brunswick and Waynflete.

The coach of this years' team is Mark Coulstan, and the assistant coach is Todd "Skeeter" Pearson. Some of the members of the team include: Andy Curry, Gary Lorfano, Bill Curry, Jeff Greenleaf, Kevin McMillion, Brent Pearson, Chris Giesecke, Bill Haskell, Ron DeDoes, Dan Fahey, Jim Beaulieu, Scott True, Dwight Doucette, Ted Skillings, Dana Taylor, Chris Labby, Rob Pendelton, and Hung Lac.

Girls Basketball
by Jen Hawkes

The girl's basketball season is just about to come to an end. The season was very successful. They became Class A this year and had a good schedule. Currently their win/loss record is 12-4. The girl's have two games left, which are Kennebunk on Wednesday and Windham next Wednesday. The Class A tournament standings place the Scarborough girl's in third place at this time. As the point system works, the girl's expect to finish up in fourth place. This would mean that they will play on February 27 at the Civic Center. This will mark the first time the girl's will play at the Civic Center. They have done an excellent job this year, and hope that many fans will support them at the tournament coming up.

Boys' Basketball
by Jim Grover

"Inexperienced and young" at the beginning of the season, the boys team is doing much better. With each game, the team learns something new. Mr. Costigan feels the team is doing quite well considering all of the new players and a new program; in time the players will gain experience. "They have played well at home games", said Mr. Costigan. He tries to give the team support on and off the court by constructively criticizing them. Brett Bennett and Paul Lamy have been called up to the varsity squad.

The boy's final game is at Kennebunk, and we wish them luck.

TRIVIA

1. Name the grammer school Beaver Cleaver attended on "Leave it to Beaver".
2. What product's slogan is "Plop, plop, fizz, fizz, oh what a relief it is"?
3. Name the butler on "Batman".
4. How many people were shipwrecked on "Gilligan's Island"?
5. What dolphin had his own T.V. series?
6. Name Richie Cunningham's sister on "Happy Days".
7. For what newspaper did the mild-mannered Clark Kent work?
8. What is the "Sanfrancisco Treat"?
9. Who says, "I get no respect at all"?
10. Name the hometown of Howdy Doody and friends.

BOOK REVIEW
by Jen Winch

The newest novel out by Stephen King is The Tommyknockers.

The story is set in a small Maine town, Haven. Bobbi Anderson, the main character, stumbles over a piece of metal sticking out of the ground in the woods, this turns out to be a gigantic alien space ship.

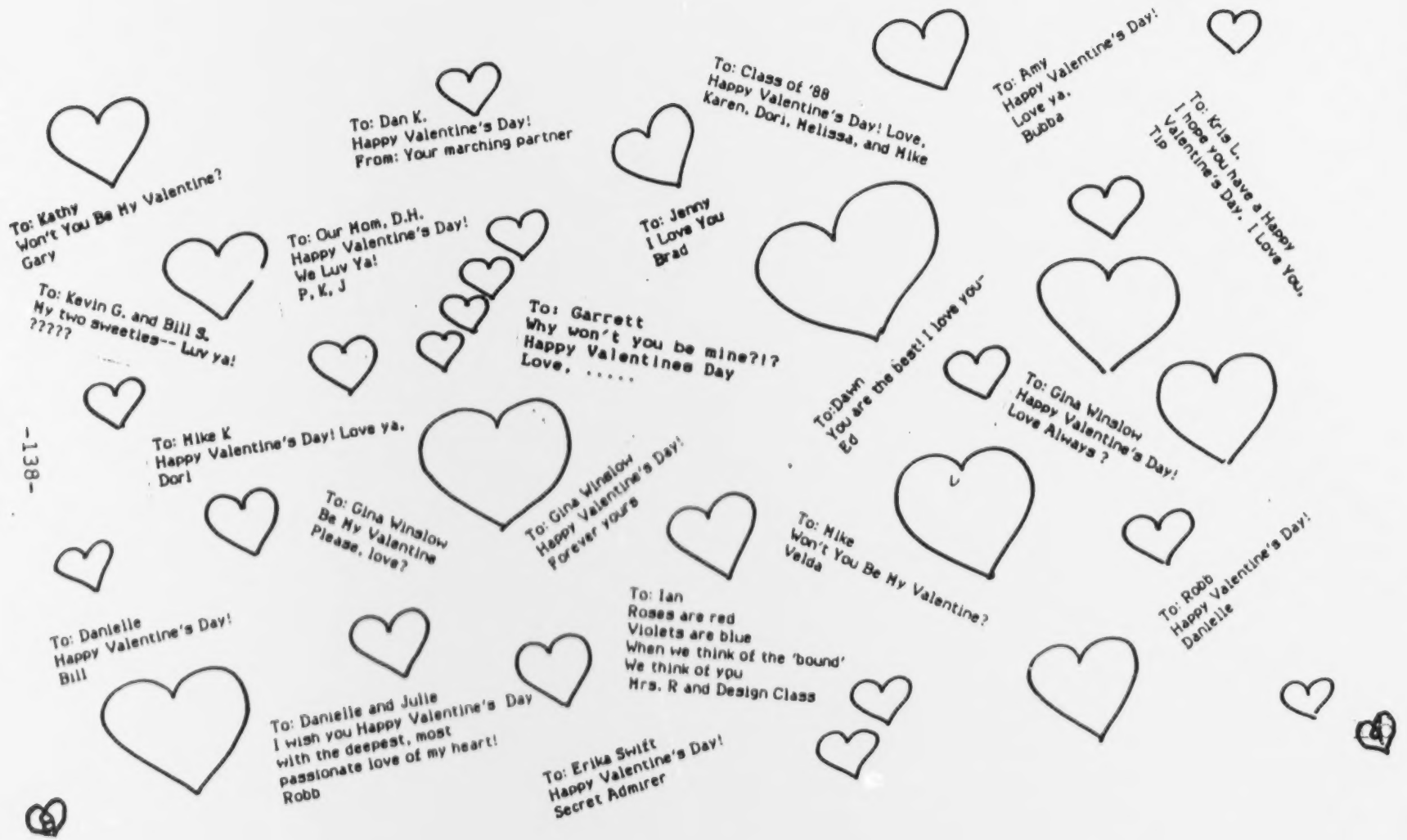
A wierd sensation comes over her when she attempts to touch it. Gradually this senstion over comes the inhabitants of the town; except for Jim Gardner, Bobbi's friend, who appears to be immune to the alien sensations because he has a metal plate in his head. This sensation is changing the inhabitants into aliens. They're "becoming".

This book is not long, only about 550 pages, but it's slow reading.

Mr. King seemed to have taken the plot of this novel from a low grade horror movie.

I was very disappointed with this book. I expected more from Stephen King.

After reading The Eyes of the Dragon and It, I was anxious for another horror/fiction book that would keep me totally enthralled until the end. The Tommyknockers was not one of those books.


To: Kathy
Won't You Be My Valentine?
Gary
To: Dan K.
Happy Valentine's Day!
From: Your marching partner
To: Class of '88
Happy Valentine's Day! Love,
Karen, Dori, Melissa, and Mike
To: Amy
Happy Valentine's Day!
Love ya,
Bubba
To: Kris L.
I hope you have a Happy
Valentine's Day. I Love you,
Tip
To: Our Mom, D.H.
Happy Valentine's Day!
We Luv Ya!
P, K, J
To: Jenny
I Love You
Brad
To: Kevin G. and Bill S.
My two sweeties-- Luv ya!
?????
To: Garrett
Why won't you be mine?!?
Happy Valentines Day
Love, ...
To:Dawn
You are the best! I love you-
Ed
To: Gina Winslow
Happy Valentine's Day!
Love Always ?
To: Mike K
Happy Valentine's Day! Love ya,
Dori
To: Gina Winslow
Be My Valentine
Please, love?
To: Gina Winslow
Happy Valentine's Day!
Forever yours
To: Mike
Won't You Be My Valentine?
Velda
To: Robb
Happy Valentine's Day!
Danielle
To: Danielle
Happy Valentine's Day!
Bill
To: Danielle and Julie
I wish you Happy Valentine's Day
with the deepest, most
passionate love of my heart!
Robb
To: Ian
Roses are red
Violets are blue
When we think of the 'bound'
We think of you
Mrs. R and Design Class
To: Erika Swift
Happy Valentine's Day!
Secret Admirer

Appendix F

"Basic Electronics" and "Basic Digital Electronics"
Course Summaries, Course Outlines,
and Sample Course Materials

Basic Electronics - Summary
Scarborough High School

I. Introduction.

This course was developed using funds granted by the State of Maine under the Carl Perkins Vocational Education Act. One of the goals of this grant was to update the technology curriculum in Scarborough. Although electronics had been a part of the curriculum prior to this grant, very low enrollments had prevented it from actually being taught, even though it still appeared in the curriculum guide. Even if we had had the enrollment, most of the equipment available was outmoded, being suitable only for vacuum-tube applications, and we had no training stations available to students.

Electronics was clearly identified as an important component missing from our technology curriculum. The applications of basic electronics are widespread and growing in the computer, audio, video, communications, manufacturing, design, equipment servicing, and transportation industries. The extensive use of electronics in automobiles was a particular concern, since we have eliminated two one-year automotives courses. Without these automotives courses, we were not providing students with enough chances to develop experience that would help them understand the transportation industry. The Basic Electronics course helps to balance the elimination of those two courses.

II. Course design.

This is a one-semester course that may be supplemented with a second one-semester course in basic digital electronics next year. It consists of approximately 75% laboratory experiences, backed up by lectures and hand-outs. A textbook was not obtained for use during this pilot year. However, the manual that accompanies the training kits used provided an excellent basis when reinforced by the instructor in class and on lab report comments. A search for an appropriate textbook is currently under way.

The course is open to any student with an understanding of basic algebra. It is designed to accommodate wide differences in individual progress, allowing students with a range of academic skills to successfully complete the course. This results from having enough individual training kits for each student, and varying the number and complexity of labs completed by each student. Those with greater ability do a larger number of more complex labs.

III. Equipment.

A. Training.

We needed equipment that was safe, affordable, and complete for this course. Training kits allow the most flexible approach. However, most commercially available training kits or stations are prohibitively expensive. An alternative to the use of training stations exists, of course. Students can breadboard or hard-wire all circuits using loose individual devices. However, this limits the number of circuits that can be wired, and requires an accurate means of separating and storing all necessary devices. Problems often result from students failing to replace resistors in the proper drawer, causing problems the next time they are used.

The problem of equipment was solved by purchasing 18 kits from Radio Shack. They are called 200-In-One Project Kits and are marketed as educational gifts for children. We purchased each kit for $24.00, half the normal price. The current price is $54.00.

The marketing of these kits as suitable for children is surprising. They are complete, self-contained training stations with the flexibility to provide thorough experiences suitable for a one-year course that includes circuits as complex as divide-by-four counters and as simple as switched lamps. Since they are battery powered, they are also free of the safety concerns inherent in larger power supplies.

The kits contain a variety of electronic devices that can be quickly wired with spring connectors. These devices include:

20 resistors, three diodes, two transformers, a magnetic relay switch, four transistors, ten capacitors, a seven-segment display, an antenna winding, a variable capacitor, a variable resistor with switch, six LED's, an incandescent lamp, a CdS cell, a speaker, a select switch, an earphone, and wire.

B. Testing equipment.

Testing equipment available includes one VOM meter for every 4 students, and four oscilloscopes. Additional testing equipment, including transistor testers, capacitor testers, continuity testers, and diode testers can be constructed by each student with the 200-in-one kit.

C. Labs.

1. Wiring schematics.

Labs were either taken directly from the manuals or were developed by the instructor. The manual provides wiring diagrams for each lab. Unfortunately, a numbered wiring sequence is also used, making it possible for students to wire labs without reading schematics. Therefore students were regularly required to wire from unnumbered schematics. These circuits were graded as quizzes.

2. Lab reports.

Each student was required to prepare a written report of each lab giving the purpose, circuit description, a list of each device used, the purpose of each device, a schematic sketch, a description of the lab, and an explanation of what happened. (See attached form.)

3. Lab content.

Labs designed to develop an understanding of basic electronics covered basic light circuits, a number of parallel and series resistor circuits, a number of parallel and series capacitor circuits, circuits combining both, diode test circuits, transformer circuits, photo-sensitive resistor circuit, several amplifier circuits and several tester circuits.

No digital-logic circuits were used in this one-semester course, although a second course is planned which would use these devices.

D. Soldering.

Each student was required to solder one project. A supplier was used which provided very affordable kits with printed-circuit boards. Each student soldered an acoustic ohmmeter/continuity tester provided by the instructor. The kits cost $3.00 with cases. Students were first required to test-wire the project with the 200-In-One kit. Soldering was done by students in groups of four, allowing us to purchase only four sets of soldering equipment and electronic vises.

During a second semester course, students would design and etch a circuit board for a project of their choice.

C. Soldering equipment.

Very inexpensive soldering equipment can be purchased from Radio Shack if the budget does not permit more substantial equipment. Soldering irons for this class were purchased for about $2.00 on sale.

IV. Content.

A. Background.

Background information, which is detailed in the attached course outline, was presented in class. To accommodate the variety of learning styles and academic backgrounds, lecture/demonstrations were always given in the following manner (see attached materials).

1. The material to be covered was first outlined.

2. Sheets were made with outline headings and space for notes, and duplicated for each student.

3. Overhead transparencies of the same note sheets were prepared for use during the lecture.

4. The instructor lectured using demonstrations and the front board and summarized the notes by writing onto the overhead under the proper outline headings.

5. The tests followed the format of the outlines closely to make it possible for <u>all</u> students to prepare for the tests by studying their notes.

B. Color code.

One concern of the instructor in this class was to teach the students an appropriate mnemonic device for the resistor and capacitor color code. The standard memory devices with which I am familiar are derivations of a phrase that is racist and sexist. Therefore, a new device was developed and used successfully in this class. The first letter of each word represents the first letter of a color used in the resistor code. The colors, in order from 0 to 9, are Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, and White. On the final exam, all students were able to remember and successfully apply the following mnemonic.

"Black Bears Run Over Your Grass, But Violent Grizzlies Walk."

E. Log reports.

Each student must keep all lab reports and course materials in a notebook. In addition, a daily log of individual activities must be kept.

V. Course outcomes.

This course was a pilot effort. It attracted a wide variety of students from both the career education and college preparation areas. The final examination, a copy of which follows, was a comprehensive exam that tested all areas covered in the course. The overall performance of the students was significantly higher than normal. The grades received by the students on the final exam, notebooks, labs, and their final grades were as follows:
(93 to 100 - A, 85 to 92 - B, 75 to 85 - C, 70 to 74 - D, 0 to 69 - E.)

Final exam	Notebook	Lab	Course
8 A's	10 A's	6 A's	4 A's
3 B's	3 B's	7 B's	8 B's
2 C's	2 C's	3 C's	4 C's
2 D's	1 D	0 D's	0 D's
1 E	0 E's	0 E's	0 E's

A number of factors affect the grades received by students in any given course. These grades were unusually high for classes I have taught. I see several reasons for this. Nearly all of the students had taken a course from the instructor before and had a clear understanding of the expectations. Most of the students were seniors with an interest in the area. In my opinion however, the most significant factor was the extensive use of labs. Student interest remained high, the labs were well laid out by the manual, and the training kits lent themselves to individual experimentation that could clarify the operation of devices.

V. Course outline and materials.

An outline of the course which is distributed to students follows. Most materials developed for use in this course also follow, including final exam, sample class note sheets and related quiz, lab report sheets and the proposed new course entitled "Basic Digital Electronics."

BASIC ELECTRONICS - COURSE OUTLINE

Scarborough High School

I. Course Description

This one-semester course will utilize extensive lab experiences to provide students with a grounding in basic solid-state devices and circuits used in both analog and digital applications. An understanding of basic algebra is required.

II. Grading

A. Lab reports and circuit implementations	50%
B. Tests and quizzes	20%
C. Daily log and notebook	10%
D. Homework and worksheets	10%
E. Performance in class	10%

III. Course Objectives

Each student will:

A. correctly identify and use testing equipment, including continuity testers, VOM meters, and oscilloscopes.

B. identify and describe significant solid-state devices including resistors, capacitors, diodes, transformers, transistors, relays, LED's, switches, speakers, seven-segment displays, CdS cells, logic gates and batteries.

C. obtain a grade of 100% on an exam covering safety requirements for working with electricity.

D. obtain a passing grade on an examination which covers the electrical principles listed under course content.

E. produce effective soldered joints in wiring circuits.

F. complete all labs requiring temporary wiring of test circuits.

G. develop, plan, sketch, test, and permanently wire one assigned electronics-based device.

H. select, develop, plan, sketch, draw, and permanently wire a minimum of one electronic circuit of more complexity.

IV. Course Content

A. Safety
   1. Effects of electric currents on humans.
   2. Use of testing devices to assure safety.
   3. Safety advantages of battery power sources.
   4. Circuit interrupters - fuses and GFCI's.
   5. Selecting appropriate wire size.

B. Electrical principles
   1. Electron theory
   2. Atomic structure of conductors, semi-conductors and insulators.
   3. Free electrons.
   4. Current, voltage (EMF) and resistance in circuits.
   5. Series and parallel circuits.
   6. Ohm's law and power formulas and their use.
   7. Sources of electricity
      a. Electrostatic
      b. Thermal
      c. Photoelectrical
      d. Piezo-electrical
      e. Chemical action
      f. Electromagnetism
   8. Direct and alternating current.

C. Use of testing instruments.
   1. Continuity testing of A.C. and D.C. circuits.
   2. Use of ohm meter.
   3. Use of ammeter.
   4. Use of voltmeter.
   5. Basics of oscilloscope use.

D. Construction of circuits.
   1. Tools used in electronics
   2. Breadboarding.
   3. Principles of soldering.
   4. Use of circuit boards.
   5. Protecting solid-state devices from heat.
   6. Designing and acid-etching boards.

E. Operation and identification of devices.
   1. Resistors in series and parallel.
   2. Capacitors in series and parallel.
   3. Diodes and LED's
   4. Transistors
   5. Transformers and inductors
   6. Switches
   7. Fuses
   8. Speakers and microphones.

F. Basic circuits.
   1. Operational amplifier circuits.
   2. Basic digital-logic circuits.
      a. Nand-gated circuits.
      b. Flip-flop-based circuits.
      c. Timer circuits.
      d. Seven-segment display circuits.
   3. Basic radio circuits.

BASIC DIGITAL ELECTRONICS - PROPOSED COURSE OUTLINE

Scarborough High School

I. Course Description.

This one semester course would require Basic Electronics as a prerequisite. It will utilize extensive lab experiences to provide students with a grounding in logic devices and the basic logic circuits that are used to build calculators and computers. An understanding of algebra and successful completion of Basic Electronics is required.

II. Rationale.

During the Fall semester of academic year 1987 - 1988, seventeen students completed Basic Electronics, a one semester course in basic solid-state devices. The course, which relied upon extensive lab work with individual training stations, provided students with a thorough grounding in basic electronics princples. The success of Basic Electronics leads to this proposal.

The technology department does not provide vocational training. Instead, we have worked to develop a sound, broad technology curriculum that provides students with the basic skills necessary to move into a variety of fields. We have made major changes in our course offerings to do this. One of these was the elimination of two automotives courses to streamline our offerings and to concentrate on general skills development. Increasingly, the general skills necessary in many fields, particularly automotives, include an understanding of electronics concepts.

Offering a second, one semester course would not add considerably to the cost of offering only Basic Electronics. The training kits used in Basic Electronics provide the components necessary to teach digital logic as well. Many electronics textbooks available provide material on logic devices and boolean algebra, and could be used for both courses. The department already possesses oscilloscopes and other testing devices. It is also likely that there would be sufficient student interest in a second semester of electronics. Over 3/4 of the students in the Basic Electronics course this year would have continued with a second course if it had been offered.

III. Grading.

A. Lab reports and circuit implementations	50%
B. Tests and quizzes	20%
C. Daily log and notebook	10%
D. Homework and worksheets	20%

IV. Course Objectives. Each student will:

A. correctly identify and use testing equipment.

B. identify and describe logic devices including NOR, NAND, OR, and NOR gates, flip/flops and counters.

C. apply safe work practices.

D. obtain a grade of 70% or above on a comprehensive exam of the electronics principles and processes covered in the course.

E. complete all labs required of individual students.

F. develop, plan, sketch, test, draw and permanently wire one electronic circuit which incorporates an integrated circuit chip.

V. Course content.

A. Safety
   1. Use of testing devices.
   2. Capacitor dangers.
   3. Circuit interrupters.
   4. Static damage to microprocessors.

B. Binary number system.
   1. Octal number system.
   2. Hexadecimal number system.

C. Truth tables in Boolean logic.

D. Testing equipment.
   1. Logic probes.
   2. Continuity testers.
   3. Volt/Ohm/Milliameters.
   4. Oscilloscope use.

E. Devices.
   1. Operational amplifier.
   2. Logic gates.
      a. NAND, NOR, OR, AND gates.
      b. Inverter
   3. Flip-flops.

F. Simplifying logic circuits.

G. Sequential logic circuits.
   1. Counters with seven segment displays.
   2. Shift registers.
   3. Decoders.
   4. Multi-vibrators.

BASIC ELECTRONICS

SCARBOROUGH HIGH SCHOOL
MR. ABBOTT

NAME_____ DATE_____

ELECTRONICS PRE-TEST

1. DEFINE ELECTRICITY.

2. DEFINE MATTER.

3. DEFINE VOLTAGE.

4. DEFINE CURRENT.

5. DEFINE RESISTANCE.

6. DRAW A SCHEMATIC DIAGRAM OF A SERIES CIRCUIT, WITH 4 RESISTORS.

7. DRAW A SCHEMATIC DIAGRAM OF A PARALLEL CIRCUIT WITH 5 RESISTORS.

8. WHAT DOES A RESISTOR DO?

9. WHAT DOES A TRANSISTOR DO?

BASIC ELECTRONICS - FINAL EXAM

NAME_____DATE_____

The following exam consists of short answer, true-false, math problems, sketches, and a schematic diagram that you must wire correctly using your training kit. There are 150 possible answers, each worth 2/3 points.

GOOD LUCK

A. POST-TEST TO COMPARE WITH PRE-TEST RESULTS.

Define the following electrical terms:

1. Electricity.

2. Matter.

3. Voltage.

4. Current.

5. Resistance.

6. Draw a schematic diagram of a series circuit, with four resistors.

7. Draw a schematic diagram of a parallel circuit with five resistors.

8. What is the function of a capacitor?

9. What are the functions of a transistor?

10. What are the functions of a diode?

B. BASIC ELECTRICAL THEORY.

Match the following terms with the correct definition:

_____11. Element.	a. The smallest form of a compound that still retains the characteristics of that compound.
_____12. Atom.	b. A basic building block of nature that can not be broken down into any other substance. Examples include silicon, oxygen, and copper.
_____13. Compound.	c. The smallest form of an element that still retains the characteristics of that element.
_____14. Molecule.	d. A combination of two or more elements whose atoms have combined to form a new substance. Examples include salt, rust, and water.
_____15. Proton.	e. A particle with a negative charge which orbits the nucleus.
_____16. Neutron.	f. A particle with a positive charge which forms part of the nucleus of an atom.
_____17. Electron.	g. A particle with a neutral charge which forms part of the neucleus of an atom.
_____18. Conductor	h. A material with less than four electrons in the outer shell of its atoms.
_____19. Insulator.	i. A material with four electrons in the outer shell of its atoms.
_____20. Semiconductor.	j. A material with more than four electrons in its outer shell.

_____21. Law of charges. k. Opposite charges attract, like charges repel.

22. Draw a diagram of an atom with two electrons in the first shell and four electrons in the outer shell, and label each of the parts of the atom. **SHOW THE CHARGE OF EACH OF THESE PARTICLES.**

The following list gives each of the six sources of voltage. Describe each of these sources and give one example of each.

23. Electromagnetism.

24. Pressure.

25. Thermal.

26. Friction.

27. Light.

28. Chemical reaction.

C. CALCULATIONS IN ELECTRONICS.

What do the following letters stand for?

_____29.	I =	a. Coulombes
_____30.	E =	b. Current
_____31.	R =	c. Voltage
_____32.	P =	d. Resistance
_____33.	C =	e. Power

In the space below, make three columns. In the first column write the memory device for resistor color code. Do this one word at a time in a vertical format.

In the second column write the color that each word in the memory device stands for.

In the third column write the number that is represented by the color.

	Memory Device	color	number
34.			
35.			
36.			
37.			
38.			
39.			
40.			
41.			
42.			
43.			

Draw a sketch of a resistor (not a schematic) with the following color bands labeled carefully: 1st - Green, 2nd Orange, 3rd - black, 4th - silver.

44. What is the value of this resistor in ohms? _____

45. What does the silver band tell you?

46. What is the formula for total resistance in a series circuit?

$R_T =$

47. Draw a sketch of three resistors connected in series where R_1 =40K ohms, R_2 = 20K ohms, and R_3 = 1000 ohms.

48. What is the total resistance (R_T) for this circuit?

49. Give the formula for total resistance (R_T) in a parallel ciruit.

50. Draw a sketch of three resistors connected in parallel. R_1 = 2 ohms, R_2 = 8 ohms, and R_3 = 4 ohms.

51. Calculate R_T for this circuit.

52. Sketch the memory device for ohms's law and the memory device for the power formula in the space below.

a. Ohm's Law b. Power formula

53. Complete the following equations:

Ohm's Law	Power formula
a. E =	d. P =
b. I =	e. I =
c. R =	f. E =

Solve the following equations for the unknowns:
SHOW ALL OF YOUR WORK AND GIVE THE CORRECT UNITS.

54. E = ?
I = .3A
R = 10 ohms

55. I = ?
E = 12V
R = 3 ohms

56. R = ?
I = .05 A
E = 2.5 V

57. P = ?
I = 10 A
E = 120 V

58. I = ?
    P = 200 W
    E = 25 V

59. E = ?
    P = 1200 W
    I = 40 A

D. ELECTRONICS DEVICES.

Define each of the following terms and give the correct schematic symbol:

60. Resistor.

61. Battery

62. Switch.

63. Variable resistor.

64. Relay.

65. Light bulb.

66. Wire.

67. Capacitor.

68. LED.

69. Diode.

70. NPN Transistor.

71. PNP Transistor.

72. Alternating current.

73. Voltmeter.

74. Transformer.

75. Key.

76. Ammeter.

77. What is the formula for the Total Capacitance of three capactitors connected in series?

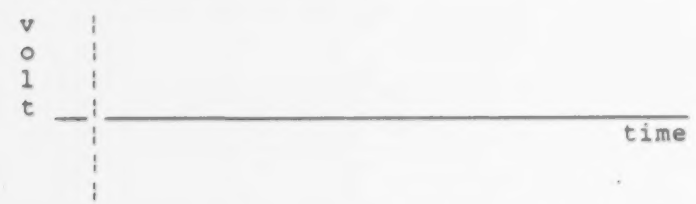
78. What is the formula for the Total Capacitance of three capacitors connected in parallel?

E. ELECTRONIC CIRCUITS.

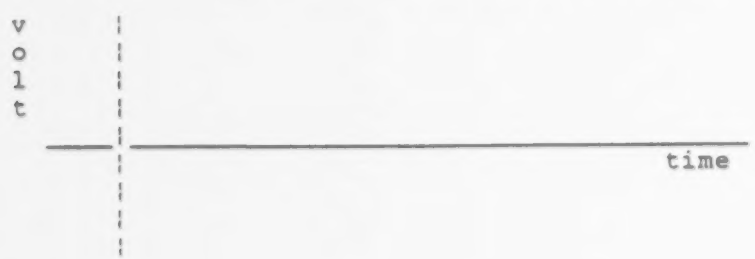
79. What do the letters A.C. stand for?

80. What do the letters D.C. stand for?

81. Sketch a simple graph which shows D.C. current over time. Make one axis of the graph represent voltage level, the other represent time.



82. Sketch a simple graph which shows A.C. current over time.



T or F 83. One hertz = one complete cycle of A.C. current.

T or F 84. The frequency of electricity is 60 Hz in all parts of the world.

T or F 85. The frequency of electricity used in the United States is <u>always</u> 60 Hz.

T or F. 86. When a wire winding is passed through a magnetic field, electrons are forced to move in the winding.

T or F. 87. When electrical current is passed through a winding, a magnetic field results.

T or F. 88. The switch in a relay is made from copper.

T or F. 89. The switch in a relay is made from carbon.

T or F. 90. The switch in a relay is made from steel.

T or F. 91. Electricity can be generated by turning a generator.

T or F. 92. A generator can be turned by hand to produce electricity.

T or F. 93. All automobiles sold in the U.S. have a generator or an alternator that produces 12 volts.

T or F. 94. An ammeter measures voltage in amps.

T or F. 95. An ohmmeter measures current in ohms.

T or F. 96. A voltmeter measures voltage in volts.

T or F. 97. A multimeter can measure current, resistance or voltage.

T or F. 98. A.C. can be converted to D.C. by using diodes.

T or F. 99. Polarity does not have to be followed when checking the voltage of a battery with a voltmeter.

T or F. 100. Polarity does not have to be followed when checking the voltage of A.C. current with a voltmeter.

T OR F. 101. Electrons flow from the negative terminal of a battery to the positive.

T or F. 102. A 100K resistor is equal to a 10000 ohm resistor.

T or F. 103. The actual resistance in any circuit is due only to the resistors used.

T or F. 104. A long wire has less resistance than a short wire of the same material.

T or F. 105. A large gauge wire has less resistance than a smaller gauged wire of the same material.

T or F. 106. A capacitor will allow D.C. current to flow through it, but will block A.C. current.

T or F. 107. A capacitor normally stores a charge and than discharges.

T or F. 108. The pitch of a tone will go down if the capacitance in the circuit goes up.

T or F. 109. The longer a capacitor is charged, the longer it will take to discharge.

T or F. 110. An electrolytic capacitor can store a large charge in a very small area.

T or F. 111. A variable capacitor is used as the tuning control in your training kit.

T or F. 112. The discharge rate of a capacitor is slowed down by adding resistors to the circuit.

T or F. 113. The voltage drop across a diode is fairly constant, no matter which resistors are used, or what batteries are used.

T or F. 114. A transformer is used to increase or decrease the voltage in a circuit.

T or F. 115. The resistance of a CdS cell is not affected by light.

T or F. 116. You could be electrocuted by a television set, even if it is not plugged in.

T or F. 117. The fuses in your house are designed to protect you from electrocution.

T or F. 118. A standard wall outlet can provide over 100 times the amount of current needed to kill you.

T or F. 119. The number 8 would be formed by a seven segment display if the following segments were lit up: a,b,c,d,e,f,and g.

120. Sketch a schematic of a simple LED circuit showing how the voltage drop across the LED would be measured with a voltmeter.

121. Sketch a schematic of a simple lamp circuit showing how an ammeter would be connected to measure current through the lamp.

122 - 150. (29 x 2/3 = 20 points). Wire the following schematic, using your kit. Check the results, using your batteries. Have me check it before you take it apart. When I have marked your points in the following space, disconnect all wires wind similar colors together, and remove the batteries from your kits.

Successfully wired _____. Unsuccessfully wired _____.

Full credit _____. Partial credit _____.

ELECTRONICS LAB REPORT

Name _____ Date_____

1. Name of lab_____ 2. Lab number_____

3. Purpose of lab:

4. Description of circuit:

5. List each device used and describe its purpose in circuit.

	Device	Purpose
a.		
b.		
c.		
d.		
e.		
f.		
g.		

6. Sketch the schematic diagram of this circuit.

Back of sheet

7. Describe what happened during the lab.

8. Explain why that happened.

Basic Electronics
Lab worksheet

Name _____
Date _____

Use your lab manuals and the results of your labs to answer the following questions:

Questions cover labs 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 40, 41, 42, 43, 44, 48, 53, 56, 60.

1. How does current flow, from negative to positive or positive to negative?

2. Why won't electricity flow through an open circuit?

3. What happens when electric current runs through a coil of wire?

4. What happens when a magnetic field moves through a coil of wire?

5. What kind of metal must be used to make a switch in a relay?

   Why?

6. Draw the following schematic symbols:

   a. lamp

   b. switch

   c. key

   d. relay

   e. battery

   f. resistor

7. What does the K mean in the designation 33K ohms resistor?

8. Sketch two resistors in parallel.

9. Sketch two resistors in series.

10. If a simple circuit contains a lamp, a relay, a switch and a 3.3K resistor, what is the actual total resistance in the circuit?

    a. less than 3.3K ohms.
    b. more than 3.3K ohms.
    c. 3.3K ohms.

11. What has more resistance, a long wire or a short wire?

12. What has more resistance, a large-gauge wire or a small-gauge wire?

13. Explain what it means that a variable resistor is linear.

14. What kind of current can flow <u>through</u> a capacitor?

15. What function does a capacitor normally have in a circuit?

16. When two capacitors are connected in series, does the capacitance go up or down?

17. What happens to the pitch of a tone when the capacitance in a speaker circuit goes up?

18. Draw the schematic symbols for the following components:

    a. capacitor

    b. transistor (NPN and PNP)

    c. transformer

    d. speaker

e. LED

f. diode

g. select switch

19. Does the rate at which capacitors discharge change when they are charged for a longer period of time?

20. What important characteristic do electrolytic capacitors have?

Do you have to follow polarity when using them in a circuit?

21. What electronic component is used to make a tuning control?

22. What would happen to the charge and discharge rates of a capacitor if a resistor was added to the circuit?

23. What would happen if alternating current (AC) were passed through a diode? Would it allow a constant current flow?

24. Explain the answer to question 23.

25. How is the voltage drop across a diode affected by a change in the voltage supplied by the battery?

26. How is the voltage drop across a diode affected by a change in the resistance in a circuit?

27. How is this property used in a circuit?

28. Draw a schematic showing a forward biased diode.

29. Draw a schematic showing a reverse biased diode.

30. Explain how a transformer works.

31. What does a CdS cell do?

32. Draw a seven-segment display and show how you would have to wire it to make the letter A. Show the resistors required to protect the diodes.

33. Draw the schematic for a PNP transistor and an NPN transistor and label all three of the parts.

34. How does the current flow through each (lab 56).

35. In what way is a transitor similar to a diode?

36. What is the minimum number of transistors required for a push/pull amplifier?

STUDENT NOTES SHEETS BE USED DURING PRESENTATION BY INSTRUCTOR

BASIC ELECTRONICS SCARBOROUGH HIGH SCHOOL

ELECTRONICS BASICS MR. ABBOTT

I. ELECTRICITY/ELECTRONICS

II. BRIEF HISTORY

A. GREECE

B. ENGLAND

C. UNITED STATES

1. BENJAMIN FRANKLIN

2. THOMAS EDISON

3. FAIRCHILD SEMICONDUCTOR

III. DEFINITIONS

A. ELECTRICITY

B. MATTER

C. ELEMENT

D. ATOM

E. COMPOUND

F. MOLECULE

IV. ATOMIC STRUCTURE

A. DIAGRAM

B. NUCLEOUS

1. NEUTRON

2. PROTON

C. ELECTRONS

D. THE LAWS OF ELECTROSTATIC CHARGES

E. VALANCE

1. CONDUCTOR

2. SEMICONDUCTOR

3. INSULATOR

V. ELECTRONICS PRINCIPLES

A. COULOMBS

B. CURRENT

1. DEFINITION

2. MEASUREMENT

C. VOLTAGE

1. DEFINITION

2. MEASUREMENT

3. SOURCES

a. MAGNETISM

b. FRICTION

c. PRESSURE

d. HEAT

e. CHEMICAL

f. LIGHT

4. CONNECTING BATTERIES AS VOLTAGE SOURCE

a. SERIES

b. PARALLEL

D. RESISTANCE AND CONDUCTANCE

1. DEFINITION

2. MEASUREMENT

3. SOURCES OF RESISTANCE

E. RESISTORS

1. SCHEMATIC SYMBOL

2. COLOR CODING FOR RESISTANCE

(PUT THIS INFORMATION ON A SEPARATE SHEET)

3. POWER RATING.

4. RESISTORS IN CIRCUITS

F. OHM'S LAW

G. POWER FORMULA

SAMPLE TEST OVER MATERIAL PRESENTED IN CLASS USING PRIOR NOTE SHEETS

Basic Electronics
Test - Basic electricity

Name_____
Date _____

Define the following terms:

1. Electricity.

2. Electronics.

3. Matter.

4. Element.

5. Atom.

6. Compound.

7. Molecule.

8. Current.

9. Voltage.

10. A Greek named Thales discovered that when amber was rubbed with fur it would attract small bits of straw. What kind of electrical generation had he discovered?

Why did Thales' discovery result in the name "electronics."

11. Discuss Ben Franklin's contribution to the field of electricity.

12. Draw a diagram of an atom with four electrons, and label each of the parts of the atom. **SHOW THE CHARGE OF EACH OF THESE PARTICLES.**

13. What does the following statement mean? 1 C = 6.24×10^{18} electrons.

14. What do the following letters stand for?

I =

E =

Q =

t =

The formula I = Q/t describes the amount of current that results from a specific charge moving past a point in a conductor each second. Use the formula to solve for current for each of the following:

15. **A charge equal to 180 Coulombs passes through a circuit in six seconds. What is the current (give the units).**

16. A charge equal to 9×10^{18} C passes through a circuite in 3 seconds. What is the current?

List each of the six sources of voltage. Describe each of these sources and give one example of each.

17. _____

18. _____

19. _____

20. _____

21. _____

22. _____

Appendix G

Photography Unit in "Art Criticism/Photography" Unit Outline

PHOTO UNIT OUTLINE

This unit outline has been developed as part of a course titled Art Criticism/Photography. It is a 20-day unit.

I. Day one.

A. Presentation.

Present students with books of black-and-white photographs and have them select four photographs that they find appealing for any reason. Have each student write a short description of why they find that photograph appealing.

Have each student present reasons to the class for their selection, and list those reasons on the board by grouping them, if possible, into the following categories:

1. Visual impact.

a. Light contrast

b. Texture

c. Texture contrast

d. Unusual angle

e. Unusual direction of lighting

f. Special effects (blurred images, lens)

g. Use of lines or shapes

h. Surprise composition

i. Recurring patterns

2. Content.

a. Appealing subject

b. Mood of photo

c. Humor

d. Emotional response

e. Action

f. Realism

g. Creativity of composition

B. Assignment.

Distribute cameras and/or black-and-white film. Assignment: take a roll of photos that tell a story. Try to use elements you liked in photos presented, but do not try to duplicate the photographs themselves.

Due: one week.

II. Day two.

A. Presentation.

1. Photography - technical skill or art form?

Ask whether photography is actually an art form or simply a skill that many people could master, like driving or carpentry.

What makes it an art form?

How important is it to know technique?

2. Distribute hand-outs: photo problems, photo-critique sheet, photoessay sheet.

Ask what kinds of problems people have had with photography.

Discuss the problems identified on the problem sheet.

Begin discussion of how those problems are controlled by the photographer.

Discuss roles of planning and technical mastery and happy accident (serendipity).

B. Assignment.

Have students locate 10 photographs (from home or otherwise) that they consider bad photos. Bring them to class to analyze, using the critique sheet they received (categories: film; light; movement; composition; developing.)

III. Day three.

A. Presentation.

Divide students into groups of two or three. Have them each select five photos and whole group review them for problems. Once the group has agreed on what the problems are, complete critique sheets.

B. Assignment.

Complete sheets for each member of the group.

IV. Day four.

A. Presentation.

1. Student activities. Have each student present photos and explain problems.

2. Begin presentation of notes on short history of photography and camera use. Although only history will be completed today, the following outline will be covered:

a. History

1500	camera obscura
1725	Schulze - light-sensitive material
1800	Niepce - first photo
1835	Daguerre - fixing image
1835	Talbot - wax-paper negatives
1850	Wet plate - glass negatives
1871	Dry plate - gelatin and silver nitrate
1880	Roll film - Eastman
1900	Brownie camera
1907	Color film - French
1920+	Accurate light controls
1980's	Computer-chip cameras

b. Camera

- common elements
- light controls
  - aperture
  - shutter speed
- lens
  - focal length
  - focusing
  - wide angle
  - telephoto
  - zoom
- framing photo
  - rangefinder
  - paralax error
  - through the lens
- operating mode
  - automatic
  - aperture priority
  - shutter priority

c. film
   - speed
   - grain
   - color
     - daylight
     - tungsten
     - correction filters
   - black-and-white
     - pan-chromatic
     - ortho-chromatic
   - light sensitivity
     - silver halide crystals

d. shooting situations
   - daylight
   - indoors with flash
   - action shots
   - night shots
   - tripods
   - moving camera
   - moving zoom

e. shot composition
   - rule of thirds
   - triangles
   - diagonals
   - framing
   - depth of field

f. development of film and paper

3. Pass out film-development sheet.

4. Distribute second roll of film.

B. Assignment.

1. Read two-page handout over film development.

2. Take second roll of film, experimenting with the three or more of the following techniques:

a. Extreme or unusual angles.

b. Textures.

c. High contrast in light and shadow.

d. Portraits of people or animals.

e. Landscapes or cityscapes (buildings).

f. Patterns of lines or shapes that are abstract.

V. Day five.

A. Presentation.

Continue presentation of notes on camera use and film.

Divide class into two groups of 5 students. Group One in darkroom with Mr. Abbott, Group Two with Mrs. Reed.

B. Assignment.

Bring roll of exposed film to class on Monday.

VI. Day six.

A. Presentation.

Group One in darkroom for overview of procedure.

Group Two with Mrs. Reed. Activities to be determined. Possible research project on one of following topics: use of filters; modifying depth of field; proper use of flash; pin-hole photography; report on individual photographer.

B. Assignment.

Review darkroom technique sheet.

VII. Day seven.

A. Activities.

Group One to develop film.
Pass out print-development sheet.

Group Two with Mrs. Reed.

B. Assignment.

Review print development sheet.

VIII. Day eight.

A. Activities.

Group One to make contact sheets.

Group Two with Mrs. Reed.

B. Assignment.

Complete second roll of film and use darkroom after school to develop by day ten.

IX. Day nine.

A. Activities.

Group One to make one or two enlargements.

Group Two with Mrs. Reed.

B. Assignment.

Complete second roll of film and use darkroom after school to develop by tomorrow.

X. Day ten.

A. Activities.

Group One to make contact sheet of second roll of film.

Group Two with Mrs. Reed.

B. Assignment.

Write a short comparison of the two contact sheets.

XI. Day eleven.

A. Presentation.

Group Two in darkroom for overview of procedure.

Group One with Mrs. Reed.

B. Assignment.

Review darkroom-technique sheet.

XII. Day twelve.

A. Activities.

Group Two to develop film.
Pass out print-development sheet.

Group One with Mrs. Reed.

B. Assignment.

Review print-development sheet.

XIII. Day thirteen.

A. Activities.

Group Two to make contact sheets.

Group One with Mrs. Reed.

B. Assignment.

Complete second roll of film and use darkroom after school to develop by day ten.

XIV. Day fourteen.

A. Activities.

Group Two to make one or two enlargements.

Group One with Mrs. Reed.

B. Assignment.

Complete second roll of film and use darkroom after school to develop by tomorrow.

XV. Day fifteen.

A. Activities.

Group Two to make contact sheet of second roll of film.

Group One with Mrs. Reed.

B. Assignment.

Write a short comparison of the two contact sheets.

XVI. Day sixteen.

A. Presentation.

Finish notes and review cameras, film, and darkroom process.

Test tomorrow over material covered.

B. Assignment.

Review handouts for test.

XVII. Day seventeen.

A. Activities.

Test (or complete notes if necessary).

B. Assignment.

Each student must prepare a proposal for third roll of film, based upon results of first two. The question to be answered in the proposal is "what do you hope to accomplish in this series?" That proposal will require students to explore a specific kind of composition or form by planning their shots in advance.

XVIII. Day eighteen.

A. Activities.

Each student presents proposal to class for next roll of film. Class and instructors asked to respond.

B. Distribute film.

Expose roll of black-and-white film based upon stated plan for tomorrow (Group One) or next day (Group Two).

XIX. Day nineteen.

A. Activities.

Group One to darkroom to develop film.

Group Two write critiques of each others contact sheets.

B. Assignment.

Complete critiques.

XX. Day twenty.

A. Activities.

Group Two to darkroom to develop film.

Group One to write critiques of each others contact sheets.

Appendix H

Proposed Surveying Course Outline

SURVEYING
Course Outline
Scarborough High School

I. Course Description

This course is designed to provide experience in the basics of surveying. The class will have field and classroom activities in drafting, topographical mapping, use of equipment, concepts, and methods used in surveying. Emphasis will be placed on problem solving the practical use of algebra, and plane trigonometry.

II. Course Objectives

All students will:

A. Develop an understanding of the methods used in surveying and map making.

B. Identify and apply key concepts of measurements that relate to the surveying process.

C. Plan and produce plot plans, elevation, and contour maps.

D. Develop skill in the use of surveying equipment.

E. Apply mathematics in the solving of surveying problems.

III. Course Content

A. Introduction

1. Definition of Surveying
2. Basis of Surveying
3. Importance of Surveying
4. Uses of Surveying
5. Need for Accuracy

B. The Surveying Method

1. The Elements of Surveying
   a. Horizontal Lengths
   b. Vertical Lengths
   c. Horizontal Angles
   d. Vertical Angles

2. Practical Concepts

3. Measurements of Horizontal and Vertical Lengths

4. Measurements of Horizontal and Vertical Angles
   a. Designation of Horizontal Angles

5. Measurements of Relative Horizontal Position
   a. Traverses
   b. Triangulation
   c. Azimuths
   d. Bearings
   e. Back Direction
   f. Latitude
   g. Departure

6. Measurement of Vertical Position
   a. Standard Datum
   b. Elevations
   c. Plane
   d. Benchmark

7. Solution of a Complete Surveying Problem
   a. Engineering Approach
   b. Reconnaissance
   c. Preliminary Survey
   d. Map
   e. Design or Plan
   f. Location Survey

8. Errors
   a. Human Errors
   b. Merchanical
   c. Accidental

9. Measures of Accuracy of Horizontal Measurements
   a. Degree of Accuracy
   b. Closure

10. Measures of Accuracy of a Level Survey

11. Standards of Accuracy
   a. First, Second, Third

B. Surveying Tapes and Taping

1. Steel Tapes
   a. Care of Equipment

2. Methods of Taping

3. Procedures for Taping Between Two Points
   a. Breaking Tape Process
   b. Plumb Bobs

4. Procedure for Taping to Set Marks at Certain Distances on a Given Line

5. Accuracy of a Tape
   a. Standard Tape
   b. Working Tape
   c. Tape Correction
   d. Correction for Temperature
   e. Correction for Slope
   f. Combining All Corrections

6. Electronic Distance Measurement
   a. Laser Geodimeter
   b. Dietzgen Laser

C. The Transit

1. Construction of the Transit
   a. Engineer's Transit
   b. Fundamental Parts
   c. Azimuth Axis
   d. Elevation Axis
   e. The Motions
   f. Telescopic Sight
   g. Telescope Level
   h. Horizontal Circle
   i. Verniers
   j. Compass

2. Operation of the Transit
   a. Preliminary Procedures to Set Up
   b. Measuring a Horizontal Angle
   c. Measuring Angles by Repetition
   d. Closing the Horizon
   e. Care of the Instrument

D. Traverses and Triangulation

1. Traverses Stations
   a. Use of Traverses
   b. Field Work
   c. Computation of a Traverse
   d. Loop Traverse
   e. Connecting Traverse
   f. Final Operations

2. Triangulation
   a. Use of Triangulation
   b. System of Single Triangles
   c. Lenghts and Bearings from Coordinates

E. Leveling

1. Principles of Leveling
   a. Importance of Leveling
   b. Leveling Instruments
   c. Leveling Procedures
   d. Uses and Method of Leveling

2. Applications of Leveling
   a. Profile Leveling
   b. Leveling for a Plot Plan

F. Surveys For Maps

1. Types of Maps
   a. Area Maps
   b. Strip Maps

2. Ties
   a. Horizontal
   b. Vertical (Elevation)

G. Stadia and Photogrammetry

1. Stadia Method
   a. Equipment
   b. Procedures
   c. Plotting Contours

2. Photogrammetry
   a. Equipment
   b. Procedures

H. Construction Surveys

1. Establishing Line in the Field
   a. Marking Position
   b. Setting a Predetermined Angle
   c. Establishing Direction

2. Establishing Grade in the Field
   a. Marking Elevations
   b. Setting Grade Marks

Appendix I

"Communications Technology" Course Outline

COMMUNICATIONS TECHNOLOGY COURSE OUTLINE
Scarborough High School

I. Course Description.

Communications is one of the largest industries in the world. More than half of the U.S. work force is involved with creating, working with, storing, transmitting or selling information. Many of the jobs in communications pay far better than those in other industries.

This course is a general exploration of the communications industry. Four major areas will be covered, including media, graphic, electronic, and computer communications.

II. Course Objectives. Students will:

A. Develop an understanding of the range of activities involved with the communications industry.

B. Complete lab activities in all four areas of communications.

C. Recognize and discuss the impact of communications systems on society and culture.

D. Describe the basic underlying principles of science upon which specific aspects of communications are based.

III. Course Activities.

Course activities will include classroom presentations, reading assignments, writing assignments, presentations to the class by students, quizzes and tests, and lab projects. Required projects will include the following:

A. Write and present a short report on an assigned topic which involves communications.

B. Design and produce at least one screen-printed product.

C. Design and produce a product using an offset lithographic press.

D. Design and produce one mass-produced product.

E. Plan and produce a series of photographs using black-and-white film and paper.

F. Produce a contact sheet.

G. Produce at least one black-and-white enlargement.

H. Write and develop a story board for a video or movie production.

I. Produce a video as part of a group.

J. Typeset an article using word-processing equipment.

K. Develop one computer-generated graphic.

L. Produce, as part of a group, a short book.

IV. Grading Policy.

Quarter grades will be calculated on the following basis:

Lab projects.....35%
Tests.....25%
Homework.....15%
Participation.....15%
Notebook.....10%

Assignments handed in late will lose one letter grade per day from the final grade earned, until grade is a 0.

V. Course Content.

A. Introduction to Communications.

1. Definition and history of communications.
2. Products of the communications industry.
3. Careers in communications.
4. Impact of communications on society and culture.

B. Media Communications.

1. Print media and advertising.
2. Broadcast industry.
3. Film, video, and audio recordings.
4. Journalism.

C. Graphic Arts Industry.

1. Introduction/Background.
2. History.
3. Scientific theories.
4. Careers.
5. Planning, design, and layout.

    a. Design principles.
    b. Color principles.
    c. Thumbnail sketches.
    d. Rough lay-outs.
    e. Comprehensives.
    f. Camera-ready copy.

6. Printing steps.

    a. Image design.
    b. Image assembly.

c. Image conversion.
d. Image-carrier preparation.
e. Image transfer.
f. Finishing.

7. Printing Procedures.

a. Relief (letterpress, block, stamp).
b. Stencil (screen printing, stencilling).
c. Lithography (offset duplicator).
d. Gravure (intaglic).
e. Electrostatic (Xerox copier).
f. Ink jet.

8. Photographic processes.

a. Process photography in graphic arts.
b. Photography--continuous tone black-and-white.

1. Photograph composition.
2. Cameras and controls.
3. Film developing.
4. Print making.

D. Electronic Communication.

1. Introduction/History.
2. Scientific theories.
3. Careers.
4. Information transfer.
5. Systems.

a. Telecommunications.
b. Radio/television broadcast.
c. Video production and sound recording.
d. Informational services.

E. Computer Communications Systems.

1. Computer-supported systems.
2. Human and machine interface.
3. Computer-generated broadcasting.
4. Computer typesetting, CAD and CAM.

F. Management of Communications Systems.

1. Product development.
2. Marketing the products of communications systems.

Appendix J

"Exploring Technology" Course Outline

Exploring Technology Outline — Scarborough High School
One-year freshman course — Scarborough, Maine

I. COURSE DESCRIPTION.

This course offers an overview of technology education for freshmen. It involves extensive hands-on activities that allow students to apply underlying principles of science, math, and design. Occupational safety is a major component of this course.

II. GRADING.

Quarter grades for this full-year course will be calculated on the following basis:

Projects.....35%
Tests and quizzes.....20%
Participation and conduct.....20%
Homework.....15%
Notebook.....10%

III. COURSE CONTENT.

Exploring Technology is taught in four units over a full school year. The units are electricity, power, drafting and design, and wood-frame construction.

A. ELECTRICITY.

1. Science Principles.

a. Atomic structure, electron flow, conductance.
b. Voltage, current, and resistance.
c. Generation of electricity.
d. Series and parallel circuits.
e. Application of Ohm's law and power formulas.

2. Application - electrical wiring.

a. Safety.
b. Types of conductors.
c. Wiring techniques and circuit planning.

1. Switches, 2, 3, and 4 way.
2. Outlets.
3. Current demand.

d. Circuit and Ground fault protection.

B. POWER AND MECHANICS.

1. Science principles.

a. Simple machines.
b. Work, power, force, horsepower.
c. Mechanical advantage and efficiency.
d. Internal and external combustion engines.
e. Four and two cycle engines.
f. Bernouli's law and carburation.
g. Principles of aerodynamics and drag.

2. Applications.

a. Dissassembly and reassembly of small engine.

1. Fuel; timing; exhaust, ignition, and cooling systems.
2. Precision measurements to .001".
3. Use of torque wrench.

b. Metric 500 design.

1. Aerodynamics in design.
2. Experimental process in design.
3. Measurement of velocity.
4. Computerized data gathering.

C. DRAFTING AND DESIGN.

1. Science principles.

a. Light-sensitive materials.
b. Effects of ultra-violet light.

2. Math principles.

a. Use of standard 1/16" scale.
b. Fractions.
c. Use of architect's scale.
d. Reading technical drawings.
e. Use of drafting instruments.
f. Combining angular measurements.

3. Applications.

a. Complete sketches of foundation plans and elevation of corner section.
b. Set of drawings, tracings, and diazo copy of foundations and elevation of corner section.

D. CONSTRUCTION.

1. Science principles.

a. Laws of thermodynamics.
b. Solar orientation.
c. Basic heat loss calculations.
d. Distribution of force in building.
e. Wood cell structure.
f. Characteristics of trees and wood.
g. Characteristics of cement and concrete.

2. Math principles.

a. Application of pythagoreum theorum.
b. Use of geometric forms in truss design.

3. Applications.

a. Safe tool and woodworking machine operation.
b. Actual and nominal dimensions of lumber.
c. Construction of corner section to 1/2" scale.
d. Plot preparation, floor framing, wall framing, roof framing, and finishing wood-frame house.

Appendix K

"Applied Technology" Course Outline

Applied Technology Outline
One-year Course

Scarborough High School
Scarborough, Maine

I. COURSE DESCRIPTION.

This course offers an overview of two major areas of technology -- product design and manufacture, and automotive systems. It involves extensive hands-on activities that allow students to apply underlying principles of science, math and design. Occupational safety is a major component of this course.

II. COURSE CONTENT.

Applied Technology is taught in two units over a full school year. The units are materials processing and automotive systems.

A. Materials Processing.

1. Science principles.

a. Location of metals on periodic table.
b. Atomic structure of metals.
c. Characteristics of metals.

1. Conductance.
2. Ductility.
3. Malleability.
4. Shear strength.

d. Processes of ore extraction.
e. Refining of ore into usable form.
f. Process of alloying.
g. Ferrous metals and non-ferrous metals.
h. Affect of heating on molecular arrangement of steel.
i. Body-centered cubic and face-centered cubic space lattice of heat-treated steel.
j. Hardness testing.
k. Characteristics of plastics.

1. Molecular chaining.
2. Transformation of gasseous elements to solid form.
3. Electrical resistance of plastic.
4. Thermosetting and thermoplastics.
5. Ductility, shear strength, malleability, tensile strength and compression strength of various plastics.

l. Requirements for combustion of metal.
m. Behavior of inert gasses.

2. Math principles.

   a. Decimal conversion of fractions.
   b. Precision measurement to .001".
   c. Calculations of RPM.
   d. Pattern development.

3. Applications.

   a. Product design.
   b. Layout and measurement for production.
   c. Material selection and preparation.
   d. Safe use of tools and machines.
   e. Material removal.

      1. Lathe tools and operation.
      2. Milling machines types and operation.
      3. Drilling.
      4. Grinding.
      5. Cutting and filing.

   f. Casting operations.

      1. Pattern construction.
      2. Mold making.
      3. Casting.

   g. Heat treating of carbon steels.
   h. Forging processes.
   i. Welding processes.

      1. Dangers of UV and heat.
      2. Arc and resistance welding.
      3. Mig and gas welding.
      4. Heat based cutting operations.

   j. Bench processes.
   k. Sheet materials.
   l. Product finishing.

B. AUTOMOTIVE SYSTEMS.

1. Science principles.

a. Principles of mechanics.
b. Internal and external combustion engines.
c. Two and four stroke engines.
d. Electrical/electronic system operations.
e. Heat of compressed gasses.
f. Thermodynamics in engine construction.
g. Hydraulically controlled simple machines.
h. Change of state in air conditioning.
i. Frictional resistance to travel.
j. Chemical generation of electricity.
k. Trouble shooting as an application of the scientific process.
l. Power transmission through gears.

2. Math principles.

a. Precision measurement.
b. Metric system of parts design.
c. Calculating compression ratios.
d. Camber angle measurement.

3. Applications.

a. Inspection procedures for automobiles.
b. Analysis of basic engine operation.
c. Basic tune-up processes.
d. Analysis of hydraulic brake systems.
e. Basic repair of hydraulic brakes.
f. Analysis of suspension systems.
g. Basic adjustments of suspension systems.
h. Brazing and welding techniques of sheet metal repair.
i. Analysis of cooling and air conditioning.
j. Basic maintenance of cooling system.
k. Analysis of drive train.
l. Basic maintenance of drive trains.

BEST COPY AVAILABLE

Appendix L

Modified "Wood Technology" Course Outline

WOOD TECHNOLOGY Scarborough High School
Course Outline for Students

Course Description.

This course is designed to provide experience with furniture design and with wood as a manufacturing material. Students will develop design skills, develop skill in the safe operation of woodworking equipment, and learn biological and mechanical characteristics of a variety of woods. Each student will produce at least two products, one assigned and one of his or her design.

Course Objectives. Each student will:

1. Design and produce two pieces of furniture.
2. Identify major historical furniture styles.
3. Use hand and power tools safely.
4. Develop accurate and neat project plans.
5. Identify 10 of 15 covered species of woods.
6. Identify key characteristics of wood.
7. Identify 5 basic joints used in cabinet making.
8. Calculate wood used in board feet.

Grading Policy.

Quarter grades for this one semester course will be calculated on the following basis:

Projects.....35%
Tests and quizzes.....20%
Participation and conduct....20%
Homework.....15%
Notebook.....10%

Student Behavior.

Students are required to follow all safety rules and to participate in duties assigned under the personnel system. Students are also expected to be on time and prepared for class, to make up missed work and to co-operate with other students and the instructor.

Course Content.

1. History of furniture design.

    a. Form resulting from function.
    b. Development of form despite function.
    c. Renaissance and Victorian furniture design.
    d. Re-emergence of function in colonial and shaker furniture.
    e. Bauhouse and modern furniture design.

1. Wood biology.
    a. Wood harvesting.
    b. Cellular structure in hard and soft wood.

2. Designing products for manufacture.
    a. Design principles.
    b. Design sketching and drawing.

3. Wood identification.
    a. Species of wood.
    b. Characteristics of wood.

4. Tree identification.
    a. Hardwoods.
    b. Softwoods.

5. Safety.
    a. General shop and hand tools.
    c. Power woodworking machines.

6. Lab organization and management.

7. Wood selection.

8. Wood preparation for cabinet making.
    a. Layout.
    b. Squaring stock.
    c. Power machine operations.

9. Adhesives and gluing.
    a. Kinds of glue.
    b. Preparing wood for gluing.
    c. Steps in gluing.

10. Joinery.
    a. Purposes of different joints.
    b. Construction of common joints.

11. Wood fasteners.
    a. Common types.
    b. Installation.

12. Abrasives and sanding.

13. Wood finishing.

Appendix M

"Energy-Efficient Residential Design"
Course Outline and "Hot Can" Energy-Unit Materials

ENERGY-EFFICIENT RESIDENTIAL DESIGN

Scarborough High School--Course Outline
Length of course: One semester Name_____

I. Description

This course covers the materials, processes, products and priniciples used in designing and constructing energy efficient housing. Emphasis is placed on history, solar concepts, current developments in construction, insulation, windows, heating systems, and air quality. The class will apply some of the building techniques to be studied in the construction of a wood-frame building during the course.

II. Grading.

The grade for this course will be based upon the following criteria:

35% A. Projects (includes drawings, research project, models, and performance in constructing building.
25% B. Tests
15% C. Performance during course.
15% D. Homework and worksheets.
10% E. Notebook.

III. Activities.

A. Research paper and class presentation of one energy-related concept.

B. Design and sketches of a single-family home, applying principles of energy-efficient design.

C. Completion of a basic energy audit of an existing single-family home.

D. Completion of an energy analysis of the home designed by each student using the Hot Can computer software.

E. Participation in the construction of a small building.

IV. Course Outline.

A. Introduction to energy-efficient design.

1. History of energy-related design elements.
2. Current need for conservation of energy.
3. Future expectation for energy availability.
4. U.S. energy sources.
5. Regional dependency on imported energy.
6. Alternative sources of energy.

B. Energy priniciples.

1. Vocabulary.
2. Solar insulation.
3. Laws of thermodynamics.

C. Research methods.

1. Topic selection.
2. Note taking and outlining.
3. Rough and final drafts.
4. Use of references.

D. Heating load calculations.

E. Causes of heat loss in a home.

1. Infiltration.
2. Conduction.

F. Energy use and conservation.

1. Insulation.
2. Windows.
3. Air exchanges.
4. Vapor and humidity.
5. Heating systems.
6. Hot water use.
7. Electrical appliances.

G. Sources of home energy.

1. Non-renewable.
2. Renewable.

H. Solar systems.

1. Direct gain.
2. Passive devices.
3. Active devices.

I. Site selection.

J. Development of energy-efficient building systems.

1. Earth bermed and underground.
2. Passive solar, trombe wall, and double envelope.
3. Superinsulation techniques.

a. Double-wall construction.
b. Wrap-and-strap construction.
c. Vapor barriers and air barriers.
d. Air-to-air heat exchangers.
f. Modern heating options.

ENERGY-EFFICIENT DESIGN
LAB ASSIGNMENT #2

SCARBOROUGH HIGH SCHOOL
NAME_____

You are to design a single-family house and site it on plot. You should incorporate as many energy-efficient design aspects as possible or feasible.

Scale: Use 1/8" square graph paper using a scale of 1/8" = 1' for house plans. Plot plan should be drawn to any scale that fits on the paper.

1. Site Sketch. Show:

   a. Boundary of lot using proper lines.
   b. Location of house and significant trees.
   c. Orientation of house using meridian arrow.
   d. Basic contours of property.

2. Foundation sketch. Show:

   a. Dimensions, shape, and materials of foundation.
   b. Windows in foundation walls. List size and number of panes of glass for each window.
   c. Depth of footing below grade with a separate sketch.

3. First and second floor plans. Show

   a. Shape, dimensions, and wall thickness of house.
   b. Position and purpose of each room.
   c. Location of each window or skylight. List approximate sizes of each window.
   d. Panes of glass in each window and R-value.

4. Elevation sketch. Show:

   a. Height of ceiling on each floor.
   b. Shape and slope of roof.
   c. Height of overhangs above south facing windows.
   d. Width of overhang of roof above south windows.

HOT CAN ENERGY ANALYSIS OF HOUSE PLAN

Energy-Efficient Design
Scarborough High School

Name_____

You are now going to analyze the energy needs of the house that you designed and sketched. It will be done using a computer program known as HOT CAN, developed in Canada, where they know something about the need to save energy on heating.

Before completing this analysis, you will have to do some math. All of the math involves calculating <u>areas</u> or <u>volumes</u>. Your house dimensions should be in feet. Use whole numbers. Figures in [brackets] will be used by the program.

The two formulas you will need are:

<u>Area</u> = length X width. (ft^2 = ft X ft)

<u>Volume</u> = length X width X height (ft^3 = ft X ft X ft)

A. Required figures.

1. Dimensions of house. Length_____

   Width _____

2. Area of insulated ceiling.

   Length_____ x Width _____ = [_____]

3. Area of windows. Find area of each window on each wall and add them together. If the doors have any glass, include the area of glass as though it were a window.

   South windows [_____] Panes _____R-[___]

   North windows [_____] Panes _____R-[___]

   East Windows [_____] Panes _____R-[___]

   West Windows [_____] Panes _____R-[___]

4. Area of outside doors. R-value of doors [_____]

   S _____ N _____ E _____ W _____

   TOTAL AREA OF DOORS [_____]

5. Area of walls. Find the area of each wall and subtract area of windows and doors that appear in that wall.

	Area of wall	- windows	- doors	= total area	R-value
S	_____	- _____	- _____	= _____	_____
N	_____	- _____	- _____	= _____	_____
E	_____	- _____	- _____	= _____	_____
W	_____	- _____	- _____	- _____	[_____]

TOTAL AREA OF WALLS minus WINDOWS AND DOORS [_____]

6. VOLUME OF HOUSE.

length	x	width	x	height	=	volume
_____	x	_____	x	_____	=	[_____]

The following calculations are for basement walls.
Perimeter = length + width + length + width

7. Area of basement walls above grade (Use 4' x the perimeter of found.) [_____] R-[____]

8. Area of basement walls from grade to 2 feet below grade. (Use 2' x the perimeter of foundation.) [_____] R-[____]

9. Basement walls from 2' below grade to floor. (Use same # as 8). [_____] R-[____]

10. Basement floor total area. [_____] R-[____]

Additional information

11. Air changes (natural) [_____]
Use .5 for normal construction, Use .2 for superinsulated.

12. Air changes (Mechanical) [_____]
Use 0 for normal construction, Use .5 for superinsulated.

13. Number of occupants in the house. [_____]

14. Number of KwHr for: appliances [_____] (10 - 14 KwHrs)
hot water [_____] (10 - 14 KwHrs)

HOT CAN INSTRUCTION SHEET

ARCHITECTURAL DESIGN NAME _____

To analyze the energy needs of your house, you will need a copy of a computer program called HOT CAN, and an Apple II computer. Follow these steps using your data sheet. Your data sheet must be completed to run this program.

First, a few important points:

IF THE COMPUTER ASKS FOR AN INPUT IN THE FORM OF A LETTER DO NOT PRESS THE RETURN KEY, JUST PRESS THE CORRECT LETTER.

IT IS VERY IMPORTANT TO FOLLOW INSTRUCTIONS CAREFULLY WHEN YOU ARE ASKED TO REPLACE THE DISC WITH THE WEATHER DATA DISC. IT IS ON THE BACK OF THE MAIN DISC.

IF YOU ARE USING AN APPLE IIGS, ASK MRS. HAIGIS OR MR. ABBOTT TO SET THE COMPUTER SPEED TO NORMAL.

CHECK OFF EACH OF THE FOLLOWING STEPS AS YOU COMPLETE THEM.

_____1. Make sure that the CAPS LOCK key is DOWN or the program will not work.

_____2. Put disc in drive and turn on the machine and the monitor.

_____3. Wait for the program to load. The main menu will appear.

_____4. Press the number 3 for new data.

_____5. Enter your name and the town in which you plan to build your house.

_____6. You must use COMPLETE input, so press the C.

_____7. You have used imperial units in designing, so press the I.

_____8. Select locations where your house will be built. If in Scarborough use: U.S., Eastern Seaboard, Maine and Portland when asked to make those selections.

_____9. When asked if heating season is 12 months press N.

____10. Enter correct heating season data and confirm when asked.

____11. Main floor temperature must be entered in ° C. Use the following chart:

65° F = 18° C
68° F = 20° C
70° F = 21° C
72° F = 22° C

____12. Basement will probably be unheated, so should be several degrees cooler.

____13. Temperature swing affects air conditioning. I suggest 6°.

____14. Thermal mass for a normal house will be A.

____15. Building components.

The next many steps involve separate building component data, such as ceiling area. These figures are the heart of the HOTCAN program and should be entered carefully from your worksheets. If you are asked for the size of a component that does not exist, enter the number 0.

For each entry, the program gives you a chance to change your mind by asking if the data are correct (Y/N), if there are any additions, and once again if the data are correct. Review your numbers carefully each time you are asked, and you will not make any mistakes.

____16. Basement/Crawlspace.

Basement data require several special numbers. The R-value of an uninsulated concrete block wall is 1. You should put this if you are not going to insulate the wall.

____17. Windows.

You will have windows on four walls. Decide in which direction your house is most closely oriented. You will be asked for information for 8 directions. You should have 0's for four of them unless your house has eight walls.

Any windows facing south will require information about height, header height (distance to overhang), number of glazings, overhang width and shading coefficient. The shading coefficient should be .83.

____18. When asked if you know the air infiltration rate, press N.

____19. Forced ventilation.

If you have a tight house, you must have an air-to-air heat exchanger. It requires a minimum of .5 air exchanges per hour.

____20. Base-load information depends upon your family size and use.

____21. Occupancy gains should be calculated as directed by the program.

____22. Heating efficiencies.

Enter a percentage only for those heating sources that you will be using. If you will not use propane, for instance, enter a 0.

____23. CHANGE MENU.

When you have finished all of the above, you will see the CHANGE MENU. DO NOT PRESS RETURN AFTER EACH LETTER INPUT. Use the CHANGE MENU to do the following:

a. Press the S for save. (Do not press RETURN.)

b. Type the file name SEPT24 and press RETURN.

c. Press the R for RUN. (Do not press RETURN.)

d. Wait. Watch the screen.

e. Press P for print.

____24. SAVE THE RESULTS IN YOUR NOTEBOOKS.

Appendix N

"Principles of Technology" Reviews

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: Waves and Vibrations UNIT # 9

REVIEWER: Kathleen Brown

REVIEWED FOR USE IN (grade/class) 12/ physics

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

__XX__ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

_____ As a resource for class materials.

_____ As shelf filler.

Comments:

This unit covers the concepts of waves and vibrations fairly thoroughly, But there are a few things in a unit in Physics that are not dealt with in the technology unit. The following topics that are usually covered in a Physics unit on waves and vibrations are: simple harmonic motion(springs), pendulums, damping, resonance, wave motion, the energy of waves, interference, diffraction, and standing waves. The technology unit deals with a few of the most basic of these topics but not the rest. However, the unit itself is well designed. I would be able to use the unit as written to give the basics of waves, but would need to add material from a physics book to cover the other concepts.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THIS UNIT?

	usable as is	useful as resource	No value to me
Student exercises	✓		
Student text		✓	
Math skills lab	✓		
Lab activities	✓		
Demonstrations	✓		
Teacher materials	✓		

COMMENTS:

1. Student exercises from both units are usable as is.

2. Student text-Subunit 1 The text in this subunit approaches waves from an electronic point of view whereas most physics texts approach waves from different angles. Waves are often discussed in relation to water, earthquakes, or sound.

I could use the text as additional reading material or I could use the examples given in the text when describing the action of waves in order to give the students an additional point of view.

Subunit 2 The text portion of subunit 2 is excellent. It deals with applications of waves and vibrations. Some of the applications that are discussed are relevant to students of high school age, such as the uses in music, radio and television. I feel that unit would make excellent supplemental reading for a unit in physics as there are very few applications of physics concepts discussed in physics texts.

MATH SKILLS LAB Usable as is to supplement the problems in text in physics.

LAB ACTIVITIES

Lab 9*1 Natural Frequency of a Vibrating Body- Usable as is.

Lab 9*2 Vibration Isolation- This lab is fairly complex in its set up. It deals with the practical usage of the knowledge being taught about vibrations. Because the lab is very technical, I feel that a normal physics student might need some help with the assembly of the equipment. Either very detailed directions could be written up or tne instructor could set up the equipment ahead of time to add the students.

Lab 9*3 Resonance of Sound Waves in a Hollow Tube- I don't feel that I would have any use for this lab. It's set up is even more technical than Lab 9*2. If the lab had any relationship to everyday use, I might consider using it, but not as it is.

Lab 9*4 Measuring Phase Difference- This lab is also too technical for the average physics lab. I would not use it.

DEMONSTRATIONS

1. Transverse and Longitudinal Waves
2. Resonance and Vibrations

Both of these demonstrations are clear and simple to do. There are questions provided to give the students a chance to formulate their own ideas about waves and vibrations. The demonstrations can also involve the students. I feel that it is easier for the student to understand some of the concepts if they actually participate in the activity. I would use both of these demonstrations as is.

TEACHER MATERIALS

The teacher materials are very well put together. There is an overview at the beginning of the unit that gives the objectives to be learned, the main ideas and the path to follow as you proceed through the unit. There are also notes added in throughout the text. I find this more helpful than having all of the teacher materials in the front of the textbook.

ARE ALL SUBUNITS OF EQUAL VALUE?

I feel that the subunits are of equal value as they are presented in this unit. They are not of equal value to me. Because most of the information in subunit one is given in a regular physics text, it is not as valuable to me as the information presented in subunit two.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

Yes.

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is_____ Yes, with major changes_____

No. but useful only as resource__✓__ No. not at all_____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

The science concepts that are stressed in this unit are very relative to a physics curriculum. I would use quite a bit of the information and ideas presented here just as they are given and it would be very nice to have a copy of the curriculum around to be used whenever it would fit in to my curriculum.

VIDEO TAPES

I did not get to see the videos.

RECOMMENDATIONS

I would recommend this curriculum for use in a technology class and would use some of the information for my own class if it was available.

Student Exercises=These are a good evaluation of a students understanding of the material. There should be some higher level comprehension questions.

Student Text=the text is well written and comprehendable. Key words and main topics are in bold print. Examples presented throughtout the text are of particular value to the student because they are "real life" problems that a student can understand. Comprehension is aided by diagrams and drawings that could at times be more detailed and technical.

Math Skills=The problems are ood ones but I feel the math skills required to do the work are quite high. A strong math backround would be neccessary to complete the units.

Lab=Situations set up in the labs are good ones. The realistic exercises and problems to work previous to the lab were a good preparation. Objectives and instructions were c'early defined and safety precautions noted. I felt the teachers notes were helful in allowing the teacher to prepare the lab. An alternative lab that could illustrate the point should be provided. Often times a teacher does not have the materials needed to initiate a particular lab. Also, the ability level of students varies so greatly, that often times a scaled down version is needed to teach the same concept.

Demonstrations=These were useful and I feel would be well suited to most any science classroom, whether the unit were being used as a whole or as a resource.

Teacher materials=Adequate but very structured. There is not a list of "suggested activities" that allow a teacher to select options which meet his/her resources and the individual needs of the student. I especially feel this is true in the lab sections. There are no alternative activities to chose from and no modified labs to use for "slower" students.

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: POwer UNIT # 6

REVIEWER: Amy Barker

REVIEWED FOR USE IN (GRADE/CLASS): _____

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

__X__ As a resource for class materials.

_____ As shelf filler.

COMMENTS: The program unit 6-Power is well organized and presented in a clearly defined manner that would make implementation into a science/technology program quite easy. Of particular value is the clear layout of each sub-unit. It would also be easy to work parts of this program into any science curriculum.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	X		
Student text	X		
Math skills lab		X	
Lab activities		X	
Demonstrations		X	
Teacher materials		X	

COMMENTS: See attached sheet

ARE ALL SUBUNITS OF EQUAL VALUE? Although each sub-unit is designed in the same way and I basically liked the presentation of each, I feel the Power in Thermal Systems (subunit 4) would be ~~of more use to me.~~

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

Rating the program overall, I would say that the material is suitable for the age level of my students, although it would have to include modifications to be utilized in my classroom. The math level of ~~much of the program is beyond the ability level of the students~~ I teach

IF NOT, COULD IT BE ADAPTED? Yes. I do not believe that this would require a major overall of the unit.

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource X No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

I believe it could be incorporated into ~~existing curriculum or~~ should certainly be looked at closely if the curriculum were evaluated and revised. I would be most interested in making use of the lab ~~activities, which I feel are quite well done and require interpretation on the part of the student.~~

VIDEO TAPES

THE VIDEO TAPES:

X Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: Force Transformers UNIT # 7

REVIEWER: Amy Barker

REVIEWED FOR USE IN (GRADE/CLASS): _____

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

__x__ As a course outline, with major modifications.

_____ As a resource for class materials.

_____ As shelf filler.

COMMENTS: The Force transformers unit would be a good course outline for a physics class, or could be utilized as a resource material for a variety of science or technology courses

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	X		
Student text	X		
Math skills lab		X	
Lab activities	X		
Demonstrations	X		
Teacher materials		X	

COMMENTS: _____

ARE ALL SUBUNITS OF EQUAL VALUE? Any teacher could find at least one of the subunits of value to be used as a resource in the classroom, but I particularly liked the "force transformers in eletrical systems".(subunit 4). The primary reasone for this is because there is not alot of good material out there to teach this unit. I feel that this subunit can stand on its own.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

The material is applicable to the students I teach, but I feel I would probably have to go through the unit at a slower pace than what it was designed for. Most students of the age level I teach have little or no backround in this field and I would have to modify the program to give them backround information before beginning the unit. For this same reason, I may also have to supplement the unit in order to utilize for the age level I teach.

IF NOT, COULD IT BE ADAPTED? Yes. As stated above, with more backround information (especially in the area of math) it could be adapted to any high scool class.

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes __X__

No, useful only as resource _____ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

The Force Transformers unit would fit into a physical science curriculum quite well. I believe that if the program were to be used by a wide range of teachers that it would work best as a resource material. I would implement it into an existing curriculum but do not feel I would want to follow it step-by-step to be the major guideline for a course. The labs would be of most use to me if I were to try to fit this program into my curriculum. The demonstrations are also very good and I could definately utilize them in a range of courses.

VIDEO TAPES

THE VIDEO TAPES:

__X__ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: Not having actually reviewed the videotapes it is hard to judge how they would fit into a curriculum. It appears from the verbal description that they are quite focused and are meaningful only if used in line with the unit as is.

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: MOMENTUM UNIT # 8

REVIEWER: STEPHEN TEWHEY

REVIEWED FOR USE IN (GRADE/CLASS): TECHNOLOGY ED. 9-12

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

____ As is, with no alterations.

____ Mostly as designed, with a few modifications.

____ As a course outline, with major modifications.

✓ As a resource for class materials.

____ As shelf filler.

COMMENTS: CAN BE UNITS AS PART OF COURSES IN TECHNOLOGY + SCIENCE. EXCELLENT RESOURCE!

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	✓	____	____
Student text	____	✓	____
Math skills lab	____	✓	____
Lab activities	✓	____	____
Demonstrations	✓	____	____
Teacher materials	____	✓	____

COMMENTS: EXERCISES + MATH SKILLS LAB CAN BE USED WITH THE GUIDANCE OF THE INSTRUCTOR. LABS + DEMONSTRATIONS ARE VERY USEFUL!

ARE ALL SUBUNITS OF EQUAL VALUE? SUBUNIT I WOULD BETTER SUIT OUR NEEDS AS PART OF A SCI-TECH COURSE.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

ONLY WITH MORE GUIDANCE FROM INSTRUCTOR & CONTROLLED SITUATIONS

IF NOT, COULD IT BE ADAPTED? YES

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes ✓

No, useful only as resource _____ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

WOULD NOT ADOPT AS A FULL COURSE BUT WOULD INTEGRATE INTO A COURSE AS A UNIT.

VIDEO TAPES

THE VIDEO TAPES:

____ Have value only in the context of this course.

✓ Would be useful to me in my present course--they can stand alone.

____ Would not be useful to me.

COMMENTS: VERY WELL DONE!

RECOMMENDATIONS

UNIT IS WELL DONE AND COMPLETE. CAN BE USED WITH A WIDE RANGE OF STUDENTS DEPENDING ON INSTRUCTORS INVOLVEMENT.

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: RESISTANCE UNIT # _____

REVIEWER: GENE CHAPLIN

REVIEWED FOR USE IN (GRADE/CLASS): 7th and 8th Grade technology

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

__X__ As a resource for class materials.

_____ As shelf filler.

COMMENTS: The streamlining and lubrication activities enhance a unit that I am teaching in the Metric 500.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	_____	X	_____
Student text	_____	X	_____
Math skills lab	_____	X	_____
Lab activities	X	_____	_____
Demonstrations	X	_____	_____
Teacher materials	_____	X	_____

COMMENTS: I used a lab and a demonstration changing only some of the wording and simplifying the math approach.

ARE ALL SUBUNITS OF EQUAL VALUE? Not for my course needs.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

Yes, with only a few modifications.

IF NOT, COULD IT BE ADAPTED? Yes.

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource X No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

It will allow me to add the concept of resistance as it relates to activities that are already going on in my curriculum.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: POWER UNIT # 6

REVIEWER: GENE CHAPLIN

REVIEWED FOR USE IN (GRADE/CLASS): 7TH + 8TH

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

✓ As a resource for class materials.

_____ As shelf filler.

COMMENTS: VERY LIMITED USE. THE FORMULAS ARE HELPFUL TO SHOW RELATIONSHIPS BETWEEN THE PRINCIPLES OF TECHNOLOGY.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises			✓
Student text		✓	
Math skills lab		✓	
Lab activities			✓
Demonstrations			✓
Teacher materials		✓	

COMMENTS:

ARE ALL SUBUNITS OF EQUAL VALUE? LITTLE OR NO USE FOR MY APPLICATIONS.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

TOO DEEP FOR THE MIDDLE SCHOOL LEVEL STUDENT.

IF NOT, COULD IT BE ADAPTED? YES

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource ✓ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

POWER AS IT RELATES TO RACING.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: ENERGY UNIT # 5

REVIEWER: GENE CHAPLIN

REVIEWED FOR USE IN (GRADE/CLASS): 7TH + 8TH GRADE

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

✓ As a resource for class materials.

_____ As shelf filler.

COMMENTS: ENERGY RELATING TO SPRINGS, CAPACITORS, AND AIR MOTORS. MATH SKILLS LAB ON RATIO, PROPORTION AND GRAPHING.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	_____	✓	_____
Student text	_____	✓	_____
Math skills lab	✓	_____	_____
Lab activities	_____	✓	_____
Demonstrations	_____	✓	_____
Teacher materials	_____	✓	_____

COMMENTS: MOST NEED SOME MODIFICATION.

ARE ALL SUBUNITS OF EQUAL VALUE? YES, IF I AM TEACHING A UNIT WHERE THEY ARE APPLICABLE.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

YES, WITH SOME MODIFICATION.

IF NOT, COULD IT BE ADAPTED? YES

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource ✓ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

ENERGY IN THE INDIVIDUAL COMPONENTS WILL ENRICH THEIR UNDERSTANDING OF THE TECHNOLOGY THEY ARE APPLYING. MATH SKILLS LAB CAN BE APPLIED OVER AND OVER IN THE FULL IMPLEMENTATION OF THESE PRINCIPLES OF TECHNOLOGY.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: FORCE TRANSFORMERS UNIT # 7

REVIEWER: GENE CHAPLIN

REVIEWED FOR USE IN (GRADE/CLASS): 7TH + 8TH GRADE

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

__✓__ As a resource for class materials.

_____ As shelf filler.

COMMENTS: FOR DEEPER UNDERSTANDINGS OF SIMPLE MACHINES, HYDRAULICS, AND ELECTRICAL TRANSFORMERS.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	_____	✓	_____
Student text	_____	✓	_____
Math skills lab	_____	✓	_____
Lab activities	_____	✓	_____
Demonstrations	_____	✓	_____
Teacher materials	_____	✓	_____

COMMENTS: _____

ARE ALL SUBUNITS OF EQUAL VALUE? YES, BUT THIS MAY VARY DEPENDING ON THE COURSE FOR WHICH THEY ARE BEING UTILIZED.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

ONLY WITH MAJOR MODIFICATIONS

IF NOT, COULD IT BE ADAPTED? YES

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource ✓ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

AS ENRICHMENT FOR ACTIVITIES GOING ON IN COURSES ALREADY BEING TAUGHT.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: MOMENTUM UNIT # 8

REVIEWER: GENE CHAFLIN

REVIEWED FOR USE IN (GRADE/CLASS): 7TH & 8TH

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

✓ As a resource for class materials.

_____ As shelf filler.

COMMENTS: TO ALLOW MY STUDENTS TO CALCULATE THE MOMENTUM OF THEIR MODEL CAR AND MAKE COMPARISONS TO CLASSMATES' RESULTS.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	_____	✓	_____
Student text	_____	✓	_____
Math skills lab	_____	✓	_____
Lab activities	_____	✓	_____
Demonstrations	_____	✓	_____
Teacher materials	_____	✓	_____

COMMENTS: THE UNIT IS VERY THOROUGH BUT COMPLEX FOR THE GRADE LEVEL I TEACH.

ARE ALL SUBUNITS OF EQUAL VALUE? YES

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

ONLY PORTIONS OF THE UNIT COULD BE APPLIED TO OUR PRESENT ACTIVITIES, BECAUSE OF THE MATH INVOLVED.

IF NOT, COULD IT BE ADAPTED? IN SOME CASES

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource ✓ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

AS AN ACTIVITY THAT CAN PROVIDE AN OPPORTUNITY FOR MY STUDENT TO APPLY ANOTHER PRINCIPLE OF TECHNOLOGY.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: WAVES + [illegible] UNIT # 7

REVIEWER: GENE [illegible]

REVIEWED FOR USE IN (GRADE/CLASS): [illegible]

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

____ As is, with no alterations.

____ Mostly as designed, with a few modifications.

____ As a course outline, with major modifications.

__✓__ As a resource for class materials.

____ As shelf filler.

COMMENTS: LITTLE OR NO USE IN CLASSROOM ACTIVITIES

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	____	____	✓
Student text	____	✓	____
Math skills lab	____	✓	____
Lab activities	____	____	✓
Demonstrations	____	✓	____
Teacher materials	____	✓	____

COMMENTS: DIFFICULT TO APPLY WITH STUDENTS OF THE AGE I AM DEALING WITH

ARE ALL SUBUNITS OF EQUAL VALUE? NOT FOR MY [illegible]

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

No.

IF NOT, COULD IT BE ADAPTED? Only on a very limited basis.

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource ✓ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

Probably only in safety & prevention applications.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: RATE UNIT # 3

REVIEWER: GENE CHAPLIN

REVIEWED FOR USE IN (GRADE/CLASS): 7TH + 8TH

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

____ As is, with no alterations.

____ Mostly as designed, with a few modifications.

____ As a course outline, with major modifications.

✓ As a resource for class materials.

____ As shelf filler.

COMMENTS: TO MEASURE RATES IN ALL FOUR SYSTEMS AS THEY APPLY TO ACTIVITIES IN MY CLASSROOM.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	____	✓	____
Student text	____	✓	____
Math skills lab	____	✓	____
Lab activities	____	✓	____
Demonstrations	____	✓	____
Teacher materials	____	✓	____

COMMENTS: VERY COMPREHENSIVE AND WELL-WRITTEN.

ARE ALL SUBUNITS OF EQUAL VALUE? I WILL FIND SOME OF MORE VALUE THAN OTHERS AT THE 7TH & 8TH GRADE LEVEL BUT ONLY BECAUSE SOME APPLY MORE DIRECTLY TO WHAT IS BEING TAUGHT.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

IT IS VERY COMPLICATED FOR MY STUDENTS TO WORK WITH, BUT IT CONTAINS ALL OF THE INGREDIENTS WE NEED TO UNDERSTAND THE CONCEPT OF RATE.

IF NOT, COULD IT BE ADAPTED? YES.

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes _____

No, useful only as resource ✓ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

TO HELP STUDENTS UNDERSTAND RATE AS IT APPLIES TO THE RACING OF MODEL CARS. RATE APPLIED TO MACHINE FUNCTIONS IS ANOTHER EXCELLENT USE OF THIS UNIT.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: _____ UNIT # _____

REVIEWER: _____

REVIEWED FOR USE IN (GRADE/CLASS): _____

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

__X__ As a resource for class materials.

_____ As shelf filler.

COMMENTS: _____

_____

_____

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	X		
Student text		X	
Math skills lab	X		
Lab activities (most)	X		
Demonstrations		X	
Teacher materials		X	

COMMENTS: _____

_____

_____

ARE ALL SUBUNITS OF EQUAL VALUE? Quite similar

in quality. Well written. However some subunits (Mechanical & Fluid Systems and Thermal Systems) could be adapted more easily to a general (College Prep) Sci course, rather a purely vocational course.

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

Yes, although some students may need more math skill reinforcement.

IF NOT, COULD IT BE ADAPTED? Yes.

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____. Yes, with major changes X

No, useful only as resource _____ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

With modifications, it would be useful for most levels and areas of science.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

X Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: Did not view videos. Only read summary.

RECOMMENDATIONS

2.5hr

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: Resistance (Mechanical & Fluid Systems) UNIT # 4

REVIEWER: Catherine Doctor

REVIEWED FOR USE IN (GRADE/CLASS): 10-11th science

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

~~X~~ As a resource for class materials.

_____ As shelf filler.

COMMENTS: As a science teacher I would not use all of the unit. However, there is relevant material that could be culled to be used as resource mate

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	X		
Student text		X	
Math skills lab	X		
Lab activities		X or	X
Demonstrations		X	
Teacher materials		X	

COMMENTS: _____

ARE ALL SUBUNITS OF EQUAL VALUE? Mechanical & Fluid subunits were reviewed. They had equal value

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

Age - yes; development, probably not. Most sophomores & many juniors would have difficulty understanding conceptual aspects

IF NOT, COULD IT BE ADAPTED? yes

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes X

No, useful only as resource _____ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

Biology - not well

Chemistry - a little better. It would be best for a physics course. It has good practice (exercises & labs) that show importance of physics in life.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: Work UNIT # 2

REVIEWER: James Beam

REVIEWED FOR USE IN (GRADE/CLASS): 9/Earth Science
10/Biology

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

____ As is, with no alterations.

____ Mostly as designed, with a few modifications.

____ As a course outline, with major modifications.

X As a resource for class materials.

____ As shelf filler.

COMMENTS: Many concepts, demonstrations and problems are useful in a physical science or related class. The demonstrations and labs would probably be most beneficial in a class involving the concept of work

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	____	X	____
Student text	____	X	____
Math skills lab	____	____	X
Lab activities	____	X	____
Demonstrations	____	X	____
Teacher materials	____	X	____

COMMENTS: The math skills would be more beneficial if placed at the beginning of the unit. This would give the teacher a better idea of where any student needs work. More student exercises should be used for practice purposes

ARE ALL SUBUNITS OF EQUAL VALUE? All are equally important as part of a work unit, but some of the subunits are not as clearly represented as others. (Ex: the Work/Torque (T-10) is confusing)

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

No - The students would need to be 11th or 12th graders who have shown ability in math and science — being capable of working out the mathematical problems using scientific terms and thinking skills.

IF NOT, COULD IT BE ADAPTED? Yes, if concepts were stressed more than mathematical evaluations

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes X

No, useful only as resource _____ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

The topics of work, torque / force, etc can be used in many sciences giving both demonstrations and concepts. — Example - describing the motions of objects in space, the work done by muscle activity and so on. The demonstrations in this unit would aid the understanding of these topics

VIDEO TAPES

THE VIDEO TAPES:

X Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: The tapes should be useful in any physical science related course

RECOMMENDATIONS

A more detailed mathematics review should precede the Unit to find where students are in math. Some concepts need work to be less confusing (have better examples)

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: Resistance UNIT # 4

REVIEWER: Glen Marie

REVIEWED FOR USE IN (GRADE/CLASS): 11/12 Physics, 9/10 Tech Ed

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

_____ As a resource for class materials.

__X__ As shelf filler.

COMMENTS: The idea of resistance as a unifying concept is questionable. Ohm's first + loose with physical definition of force, Newton's 3rd law. If is terrible to unify as living as what you are unifying goes together.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	_____	_____	X
Student text - Very poor subunit 1	_____	subunit 2+3 X +4	subunit 1 X
Math skills lab - Ok, but cook-book (Good attention to units)	_____	X (maybe)	_____
Lab activities - #1 slightly trivial #2 - question whether this would work - very interesting, though	_____	X	_____
Demonstrations	_____	_____	X
Teacher materials ?	_____	_____	_____

Ok subunit 2+3+4

A couple of these are equipment intensive - drawback

COMMENTS: Some materials excellent, some very poor. Lab set-ups here Pole either expensive or trivial.

ARE ALL SUBUNITS OF EQUAL VALUE? No: 1 is useless, 2,3,4 are fairly good

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

For the 12th graders - yes

IF NOT, COULD IT BE ADAPTED? _____

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT?

Yes, adopt as is _____ Yes, with major changes X

No, useful only as resource _____ No, not at all _____

HOW MIGHT IT FIT INTO YOUR CURRICULUM?

The section on electricity are immediately useful. The Physics-flow section could be good, but would not fit into our present 1-year physics program. The Thermodynamics section falls somewhere between the above.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

PRINCIPLES OF TECHNOLOGY EVALUATION FORM

UNIT NAME: Waves and Vibrations UNIT # 9

REVIEWER: Glenn Pierce

REVIEWED FOR USE IN (GRADE/CLASS): 9/10 Physics or Physical Science

HOW WOULD YOU BE MOST LIKELY TO USE THIS UNIT?

_____ As is, with no alterations.

_____ Mostly as designed, with a few modifications.

_____ As a course outline, with major modifications.

__✓__ As a resource for class materials.

_____ As shelf filler.

COMMENTS: As written the unit is too involved for most high school classes, at least in terms of material covered. The reading level is too advanced for use with the more advanced classes.

HOW WOULD YOU CLASSIFY THESE PORTIONS OF THE UNIT?

	Usable as is	Useful as resource	No value to me
Student exercises	~~some~~	~~most~~	X ← I found level
Student text - - - - - - - - →	some	most	
Math skills lab	____	X	____ I would use some and some would not
Lab activities *	X	X	____
Demonstrations	X	____	____
Teacher materials	____	X	____

COMMENTS: (* some would require equipment acquisition) Again this seems more appropriate for an introductory course taught to older kids at a voc. school.

ARE ALL SUBUNITS OF EQUAL VALUE? I would find the more conceptual less involved units more palatable. Some of this unit's quite unmotivated and divorced from reality for the typical student

BEST COPY AVAILABLE

IS THE MATERIAL IN THIS UNIT SUITABLE FOR THE AGE OF YOUR STUDENTS?

N/A - Overshoots with material and complexity, but the understanding making well (Maybe the reading level of the style of some parts is a bit unsuitable)

IF NOT, COULD IT BE ADAPTED? too much trouble

GIVEN UNLIMITED RESOURCES, IS THIS A PROGRAM YOU WOULD WANT TO ADOPT? HOW MIGHT IT FIT INTO YOUR CURRICULUM?

I would not use this in Mid. School or perhaps not in a school in Scandinavia U.S.

VIDEO TAPES

THE VIDEO TAPES:

_____ Have value only in the context of this course.

_____ Would be useful to me in my present course--they can stand alone.

_____ Would not be useful to me.

COMMENTS: _____

RECOMMENDATIONS

Use as a resource for teaching materials

BEST COPY AVAILABLE